

REPORT ON THE INSPECTION OF CROP CUTTING EXPERIMENTS  
AT HARVEST STAGE ON A RANDOMISED BASIS, 1962-63

1. Introduction

1.1 India has a federal system of Government and agriculture is primarily a State subject. Crop forecasts and crop estimates are issued by the Central (Federal) Authority but the responsibility for these has traditionally been with the States and the Central Authority mainly collates the estimates received from various State Governments besides offering necessary technical advice. Since 1950 considerable advance has been made towards obtaining crop production estimates of major cereals and other important food-grains on an objective basis by the introduction of yield measurement at harvest time on a random sample of fields. For the second component of production, namely the crop areas, India has been lucky to have a system and a tradition in which, for the greater part, annual crop area measurements are made on a complete enumeration basis and extensive cadastral surveys have provided the necessary frame. These annual area measurements are made by officials of the Land Revenue Departments of the State Governments who prepare and try to maintain up-to-date land records for assistance in the collection of land revenue.

1.2 The work of yield measurements on a random sampling basis when introduced was entrusted to the Land Record agency where possible for obvious reasons of convenience and economy, and the work load was kept down to a level which, it was felt, could be tackled by the concerned field officials without undue strain to themselves or without adverse effect on the work. In India these officials have long been accustomed to the use of


## FOREWORD

In 1962, the Agricultural Statistics Division of the Directorate of National Sample Survey started publication of a systematic series of reports of its work with the object of wider publicity and circulation. The reports under the publication programme of 1962 related to the work done upto 1961-62 since the transfer of the work to the NSS Directorate in 1953, and with the exception of a few reports all of them have already been published. Each year reports relating mainly to the work done during the preceding year will be added to this series.

2. Since 1957-58, crop production estimates of major cereals have become available in India from two independent and parallel series, the NSS and the official, both based on objective methods of measurement of crop areas and yields. The estimates from the two series differ considerably. Undoubtedly, elaborate investigations will be required for finding out the causes of differences.

3. It was felt that the re-orientation of the programme of inspection of field work of the State series crop cutting experiments could give some evidence on the accuracy of the official estimates of yield rates. Accordingly, inspection of crop cutting experiment at harvest stage on a random basis has been organised from 1960-61 onwards. Three reports giving the results of the work carried out in Kharif 1960-61, Rabi 1960-61 and the year 1961-62 have already been brought out. This report gives the results for 1962-63.

New Delhi  
January 16, 1963

  
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who worked at the States but operated under Central direction. Observations, findings and suggestions of this team have been annually given to the Central Ministry of Agriculture and to the concerned departments of State Governments.

4. Collection of independent data on production of major cereals through multi-purpose NSS

4.1 Side by side with the above, another development was taking place independently in the statistical system in India. This was the establishment of a multi-purpose National Sample Survey (NSS) for collecting statistical data of various kinds in the socio-economic sector for use in the National Five-Year Plans. While the NSS is engaged in collecting data for planning and administrative purposes, most of it of a pioneering nature, it is also left free to do methodological work, to undertake research, and find out whether and where the data already being collected showed scope for improvement. The NSS began its work with food consumption surveys in 1951 and the results obtained through interview method gave rise to a feeling that there was considerable under-estimation in the official estimates of production of cereals and other food grains. The NSS then started in 1957-58 to collect independent data on annual production of major cereal crops through its own field agency by objective methods of measurement of area and yield. Since that time data have become available from two independent and parallel series, the NSS and the official, both based on objective methods of measurement of crop areas and yields. Though differing in respect of details of procedure the two series were, therefore, expected to show good agreement in the results. The two series however did not only differ considerably but a good deal of the difference was noticed in the estimates of production of crops which are sown largely in mixture with other crops and which are generally not raised as pure crops.

5. Differences between the procedures of NSS series and State series of crop estimation surveys

5.1 It is pertinent here to set down briefly some major points of difference between the procedures of the NSS series and the State series of crop estimation surveys. The sample size in the NSS series for measurement of crop yields is very much smaller than that used in the State series. For crop areas, the States by and large utilize the results of complete annual census, whereas the NSS obtains its estimates through sample survey with a small size of sample. The NSS uses a very small circular sample plot (or area) for measurement (weight) of harvest produce whereas the State series use a much larger sample area generally rectangular in shape in the sample fields. Again, the demarcation of such an area is done in the NSS method by the use of specially constructed frame whereas in the State series the time honoured and easier methods of using pegs, strings, and tapes are followed for demarcating the sample area. Sometimes, iron chains are used. The NSS enumerator has to handle all phases of the work himself, from sample identification to processing and weighing of the harvested grain, although inevitably he has frequently to be assisted by local residents and State officials especially in the identification of sample villages and fields. In the State series on the other hand, the work of crop area recording (to be done on a complete enumeration basis) is generally done by a different set of officials from those who do the crop cutting experiments, and not uncommonly in this latter work some phases are again done by the persons to whom the work is allotted whereas for other phases the work is delegated by them to their juniors. Thus a State official in charge of crop cutting experiment may attend the spot on the day of harvest but may leave the selection of the random field or the subsequent processing of harvested produce (for obtain-

ing weight of dry grain) to his junior. Again, the NSS field members are fully equipped with a uniform and standardised set of weights and measures whereas in the State series, though there is a provision for the supply of all the items of equipment (including balance and weights), the officials doing field work in the State series quite often rely on the accuracy of locally available weights. The harvested produce for many crops is not directly in the form of grain in terms of which production estimates are desired and are made, and the NSS procedure for subsequent processing of the harvested produce to get the weight of dry grain is nearer to what is followed by farmers than the procedure in the State series, though neither procedure quite conforms to the actual procedure followed by farmers. Thus cultivators often harvest whole plants whereas those responsible for sample yield observations in either series pick up only earheads or cobs from the plants, which contain the grain. The cultivators keep their harvested produce in the open for drying, after tying it up in stacks; in either sample series the produce from sample cuts is stored in closed bags to avoid loss in the further processing. The NSS aims at estimation of grain production primarily and of the components viz. crop acreages and yield rates incidentally; in the State series on the contrary estimates of yield rates and areas at State level are first obtained separately and then combined to give the estimated production. In the sampling design, the plan of the State survey is crop oriented in that separate planning is done for each crop with a pre-determined number of yield observations, whereas in the NSS the sample villages form a part of the overall multi-purpose sample, the ultimate number of yield observations being determined by the intensity of crops in the sample clusters chosen in the villages selected for the purpose. In their

method of estimation the NSS are more keen to avoid bias than sampling error; in the State series, the emphasis is the other way round. In brief, the NSS series claims to operate on better standards; advocates of the State series, on the other hand, contend that many refinements of the NSS technique do not in practice work out well and lead to sizeable non-sampling operational errors and that the relative effect of the shortcomings or biases in the State series has been judged to be small, and is largely compensated by the large number of observations and the greater knowledge of their officials of the areas in which they are to work.

6. Need for inspection of crop cutting experiments at harvest stage on a randomised basis

6.2 It is clear that where so many points of detail differ in the two series which can influence the estimates of production from either series, an elaborate investigation will be required for isolating the effects of various factors on the estimates, for studying these individually and in combination, and for deciding which of these are important enough to merit long range investigation. A committee of the CSO/ISI/NSS/Ministry of Agriculture/States is going into this. Meanwhile, it was felt that the Central observational team which was created specifically with the responsibility of ascertaining the validity of the State series by keeping in close touch with it and which acts as a watchdog on behalf of the Centre could initiate some aspects of this study manageable within its resources of manpower. This was all the more desirable as the State series data constitute the basis of official estimates of crop production utilized for policy purposes and if there was any room to doubt that the data were operationally defective, one way to check this up was to have a part of it collected by an independent body of persons

who being central employees, were free from influences, biases or traditions of State officials but who at the same time had sufficient contact with State procedures to be able to test these independently so that their findings would carry weight with State Governments. The Ministry of Agriculture which is responsible for crop estimates and which had taken the initiative in establishing a Central Observational Unit to watch on the efficiency of the State series was particularly interested in the adoption of the above approach for reaching a better understanding of the causes leading to the rather discrepant estimates of cereal productions between the NSS series and the State series, both claimed to be based on the data collected by scientific and objective methods. Accordingly, a beginning was made in this direction:

- (i) by obtaining data on yields on a small sub-sample of fields of the State sample by following the State procedures;
  - (ii) by obtaining data on yields on the same set of sub-sample of fields by following the NSS procedures;
- and (iii) by choosing the sample fields to give them as wide a representative character as possible rather than confining them to small area in a localised study.

6.2 A comparison of the two sets of estimates so obtained through observation of this team with the estimates from the full sample of the State series could give some evidence on the accuracy of the State estimates. In pursuance of the above approach, the programme of spot check was launched in Kharif 1960-61\*. The programme when initiated in Kharif 1960-61

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\* See (i) A.2.1, (ii) A.2.2 and (iii) A.2.3 - Reports on the inspection of crop cutting experiments at harvest stage on randomised basis - (i) Kharif 1960-61, (ii) Rabi 1960-61, and (iii) 1961-62.

was also intended to provide an idea of man-power and equipment requirements for such a check.

6.3 Considering the strength of the Central Supervisory Team, the sample size manageable by it for such a study would be small. Special attention was to be paid to ensure that the field work was carried out according to the prescribed State procedures. If errors were found in the field work of the State officials, the central observers were to rectify these and to take correct measurements. If the State officials were absent, the central observers were to do the work themselves. All possible attention was to be paid to avoid any loss of sample observations in the selected sub-sample.

#### 7. Coverage of spot check 1962-63

7.1 The spot check in 1962-63, like the spot check in 1961-62, covered seven food crops, namely, jowar (kharif and rabi), bajra, maize, ragi, wheat, gram and barley. Of these, six crops (except gram) are covered in the NSS series. There were large differences in their estimates of production from NSS and official series during 1957-58, 1958-59 and 1959-60 (see Table 0.1 below). The spot check, on a small scale, was also organised on four non-food crops, namely, jute, til, linseed and rape & mustard.

Table 0.1: Percentage difference in estimates of production between the NSS and official series of crop estimation surveys

| Crop         | 1957-58                       | 1958-59                       | 1959-60                       |
|--------------|-------------------------------|-------------------------------|-------------------------------|
|              | NSS-Official x100<br>Official | NSS-Official x100<br>Official | NSS-Official x100<br>Official |
| 1            | 2                             | 3                             | 4                             |
| Rice         | 11.4                          | 15.3                          | 15.3                          |
| Jowar (K+R)  | 33.3                          | 39.0                          | 24.0                          |
| Bajra        | 51.1                          | 58.8                          | 60.3                          |
| Ragi         | 31.1                          | 36.7                          | 41.4                          |
| Maize        | 73.5                          | 104.6                         | 72.8                          |
| Wheat        | 42.8                          | 23.2                          | 36.4                          |
| Barley       | 18.6                          | 23.1                          | 37.3                          |
| All crops(7) | 32.6                          | 36.1                          | 37.3                          |



7.2. It would have been desirable to cover under spot check the entire area under each crop chosen for the purpose. However, this was not found feasible owing to the limited strength of the Central supervisory staff in the various States. The choice of crops and States was based on the joint consideration of their relative importance in respect of area and production and the extent of differences observed (for food crops except gram) in the estimates of production from the two series.

7.3. It will be seen from Table 0.2 below that the spot check covered 12 States in Kharif and 11 States in Rabi 1962-63. The States covered for jowar (Kharif and Rabi), wheat, gram and barley accounted for about 90 per cent or more of all India production according to official estimates of these crops. For bajra, the States covered accounted for about 85 per cent of all India production. Only in the case of maize and ragi, nearly 75 per cent of the all India production is accounted for. For non-food crops also, substantial percentages of the all India production have been accounted for except for jute.

Table 0.2: Percentages of all-India official estimates of production (1961-62) accounted for by States for crops covered in the spot check

a - Kharif

| State                           | Crops covered |           |           |           |           |            |
|---------------------------------|---------------|-----------|-----------|-----------|-----------|------------|
|                                 | Kharif Jowar  | Bajra     | Maize     | Ragi      | Jute      | Sugar-cane |
| 1                               | 2             | 3         | 4         | 5         | 6         | 7          |
| Andhra Pradesh                  | 13            | 9         | -         | 14        | -         | 7          |
| Assam                           | -             | -         | -         | -         | 18        | -          |
| Bihar                           | -             | -         | 17        | -         | 20        | 3          |
| Madhya Pradesh                  | 5             | 14        | -         | -         | -         | -          |
| Madhya Pradesh                  | 17            | 2         | 10        | -         | -         | -          |
| Madhya Pradesh                  | 7             | 9         | -         | 19        | -         | 7          |
| Madhya Pradesh                  | 27            | 12        | -         | -         | -         | -          |
| Karnataka                       | 15            | -         | -         | 41        | -         | 4          |
| Orissa                          | -             | -         | -         | -         | 5         | -          |
| Punjab                          | -             | -         | 17        | -         | -         | 8          |
| Rajasthan                       | 3             | 29        | 17        | -         | -         | -          |
| Uttar Pradesh                   | 6             | 11        | 17        | -         | -         | 52         |
| <b>Total for States covered</b> | <b>99</b>     | <b>86</b> | <b>73</b> | <b>74</b> | <b>43</b> | <b>84</b>  |

Table 0.2 (Contd.)

h - Rabi

| State                    | Crops covered |      |        |            |         |                |
|--------------------------|---------------|------|--------|------------|---------|----------------|
|                          | Wheat         | Gram | Barley | Rabi Jowar | Linseed | Rape & Mustard |
| 1                        | 2             | 3    | 4      | 5          | 6       | 7              |
| Andhra Pradesh           | -             | -    | -      | 20         | -       | -              |
| Assam                    | -             | -    | -      | -          | -       | 3              |
| Bihar                    | 4             | 5    | 7      | -          | -       | -              |
| Gujarat                  | 3             | -    | -      | -          | -       | -              |
| Jammu & Kashmir          | 1             | -    | -      | -          | -       | -              |
| Madhya Pradesh           | 13            | 16   | 6      | -          | 33      | -              |
| Maharashtra              | 3             | -    | -      | 50         | -       | -              |
| Mysore                   | 1             | -    | -      | 19         | 3       | -              |
| Punjab                   | 23            | 31   | 5      | -          | -       | 12             |
| Rajasthan                | 11            | 13   | 21     | -          | 5       | 8              |
| Uttar Pradesh            | 35            | 26   | 58     | -          | 29      | 64             |
| Total for States covered | 99            | 94   | 97     | 89         | 70      | 87             |

8. Sampling Design

To appreciate the sampling plan adopted for organising the spot check, it would be desirable first to indicate briefly the statistical design adopted for crop estimation surveys in the States. The design is one of multi-stage random sampling with Tehsils (or Sub-Divisions/D.I. Circles) as the strata, villages within the strata as the primary units, fields within a village as the sampling units at the secondary stage, and finally, a plot (about) of a specified size within a sample field as the ultimate unit of sampling. The allocation of experiments among strata is generally made on the joint consideration of the acreage under the crop and number of primary workers available in each stratum such that the workload, in general, on a member of the field staff can easily be managed in the course of his other duties. As a general basis, about 100 to 120 experiments are planned in the major crop growing districts. The experiments in the case of minor districts are so adjusted that the precision of the estimates

for the Divisions and for the State as a whole is generally high. In each selected village two fields growing the crop in question are selected at random and in each of them one plot of the required size (generally 33' x 16.5') is marked at random for sample harvest. The measurement of yield of a crop within a sample field, which is usually known as a crop-cutting experiment, consists in locating and marking a plot of a specified size in the sample field, harvesting and thrashing the produce within it, and recording the weight of the produce. In a sub-sample of cases, the produce harvested from the experimental plot is also dried for determining the loss of weight due to moisture. The size and shape of the sample plot varies from State to State and may be seen in Appendix I.

8.2 The fieldwork of the survey comprising selection of fields and crop cutting experiments therein is entrusted to the staff of the State Departments of Revenue and/or Agriculture, depending on the work-load and administrative convenience.

8.3 The spot check was organised by selecting at random a sub-sample of fields out of those chosen in the State series for yield observation. For this purpose, the requisite number of villages, i.e. half the number of experiments proposed for inspection for each crop in each State, were selected with equal probability and without replacement from the list of villages selected for State series. In some of the States the practice of selecting common villages for different crops is in vogue. The procedure prescribed for selection of villages for the spot check, as in 1961-62, was such that common villages for different crops, to the extent possible, could be selected without excluding any part of the crop coverage in the State.

9. Sample size

9.1 A total sample of 2056 experiments, 1176 experiments in Kharif and 880 experiments in Rabi, was proposed to be covered under this programme on the specified crops. State-wise and crop-wise distribution of the same is given in Table 0.3 below:-

Table 0.3: Sample size and distribution of work among supervisorsA. Kharif

| State           | No. of supervisors | Number of experiments (@ 2 per village) proposed for inspection at harvest stage |       |       |      |      |        |       | Average no. of experiments. per supervisor |
|-----------------|--------------------|--|-------|-------|------|------|--------|-------|--|
|                 |                    | Jowar  | Bajra | Maize | Ragi | Jute | S.Cane | Total |  |
| 1               | 2                  | 3  | 4     | 5     | 6    | 7    | 8      | 9     | 10   |
| Andhra Pradesh  | 7                  | 40   | 20    | -     | 40   | -    | 20     | 120   | 17.1                                       |
| Assam           | 3                  | -  | -     | -     | -    | 20   | -      | 20    | 6.6  |
| Bihar           | 8                  | -  | -     | 50    | -    | 44   | 30     | 124   | 15.5                                       |
| Gujarat         | 6                  | 40   | 40    | -     | -    | -    | -      | 80    | 13.3                                       |
| Kalyana Pradesh | 7                  | 40   | 20    | 40    | -    | -    | -      | 100   | 14.3                                       |
| Madras          | 5                  | 16   | 20    | -     | 32   | -    | 16     | 84    | 16.3                                       |
| Maharashtra     | 7                  | 60   | 50    | -     | -    | -    | -      | 110   | 15.7                                       |
| Mysore          | 5                  | 20   | -     | -     | 50   | -    | 20     | 90    | 18.0                                       |
| Orissa          | 4                  | -  | -     | -     | -    | 33   | -      | 33    | 9.0  |
| Punjab          | 8                  | -  | -     | 60    | -    | -    | 30     | 90    | 11.2                                       |
| Rajasthan       | 9                  | 32   | 60    | 40    | -    | -    | -      | 132   | 14.7                                       |
| Utter Pradesh   | 13                 | 50   | 40    | 60    | -    | -    | 40     | 190   | 14.6                                       |
| Total           | 82                 | 298  | 250   | 250   | 122  | 100  | 156    | 1,176 | 14.3                                       |

B. Rabi

| State           | No. of supervisors | Number of experiments (@ 2 per village) proposed for inspection at harvest stage |      |        |            |         |                |       | Average no. of experiments. per supervisor |
|-----------------|--------------------|--|------|--------|------------|---------|----------------|-------|--|
|                 |                    | Wheat  | Gram | Barley | Rabi Jowar | Linseed | Rape & Mustard | Total |  |
| 1               | 2                  | 3  | 4    | 5      | 6          | 7       | 8              | 9     | 10   |
| Andhra Pradesh  | 6                  | -  | -    | -      | 50         | -       | -              | 50    | 8.3  |
| Assam           | 3                  | -  | -    | -      | -          | -       | 20             | 20    | 6.7  |
| Bihar           | 9                  | 30   | 30   | 30     | -          | -       | -              | 90    | 10.0                                       |
| Gujarat         | 4                  | 30   | -    | -      | -          | -       | -              | 30    | 7.5  |
| Jammu & Kashmir | 2                  | 20   | -    | -      | -          | -       | -              | 20    | 10.0                                       |
| Kalyana Pradesh | 5                  | 30   | 20   | 20     | -          | 20      | -              | 90    | 18.0                                       |
| Maharashtra     | 7                  | 30   | -    | -      | 50         | -       | -              | 80    | 11.4                                       |
| Mysore          | 8                  | 20   | -    | -      | 30         | 20      | -              | 70    | 8.8  |
| Punjab          | 8                  | 50   | 30   | 20     | -          | -       | 20             | 120   | 15.0                                       |
| Rajasthan       | 8                  | 30   | 30   | 30     | -          | 20      | 20             | 130   | 16.2                                       |
| Utter Pradesh   | 11                 | 60   | 30   | 40     | -          | 20      | 30             | 180   | 16.4                                       |
| Total           | 71                 | 300  | 140  | 140    | 130        | 80      | 90             | 830   | 12.4                                       |

It will be seen from the above table that nearly 200 to 300 experiments were proposed to be inspected on each important food crop. Apart from the considerations referred to in para 7.2 above, the strength of the Central Observational Team in each state was also kept in view while choosing crops and states and distributing experiments over states.

## 10. Personnel

10.1 In all, 82 and 71 supervisors of the Agricultural Statistics Division of the Directorate of NSS, distributed over the different States in Kharif and Rabi 1962-63 respectively, were entrusted with the inspection programme. These supervisors, although many of them had considerable experience in this type of work, were adequately trained in the operation of the programme. The programme in each state was formulated, supervised and co-ordinated by the respective Regional Officers in-charge of the central work in the States. Statistical officers from the headquarters (New Delhi) also associated themselves in providing necessary guidance.

10.2 As will be seen from table 0.3 above, the work-load for inspection at harvest stage worked out, on an average to nearly 7 villages (14 experiments) in Kharif and 6 villages (12 experiments) in Rabi per supervisor. It varied from 7 experiments in Orissa to nearly 17-18 experiments in Andhra Pradesh, Madhya Pradesh, Madras and Mysore. It may be mentioned that in Assam and Orissa, where work-load per person was comparatively less, only jute was covered under the Kharif programme.

## 11. Items of work

11.1 Selection of villages was done at the regional office at State headquarters with the help of lists of villages selected for State series which were provided by the office

of the State Bureau/Agricultural Statistician.

11.2 The field work of crop cutting experiments in States is done in three phases. The first phase of work consists in identifying the sample villages, selecting fields for yield observations according to the procedure prescribed and fixing the dates of harvesting for yield measurements. The second phase of work is done on the harvesting day and consists of demarcating the area of sample harvest from a randomly located point and taking yield observation therefrom. In the third phase of the work which is done on a sub-sample of the yield measurements, the yield of the dried grain is weighed after proper processing. Under the normal procedure observations by the central team are made at one or more of these phases, those carried out in the first phase being termed as preharvest check, in the second phase as harvest check and the third phase as post-harvest (or drriage) check. In the last phase, the Central team also obtains with advantage through enquiry information on the manner in which the work of earlier phases was carried out. In the sample check of Kharif 1960-61 a preliminary visit was paid by the supervisor to each sample village in advance of harvesting period to ensure that the primary worker had done the selection of fields etc. In 1962-63, like 1961-62, efforts were made to avoid preliminary visits for obtaining the dates of harvesting for the selected fields. In the absence of this information, however, preliminary visit had to be undertaken to avoid loss of experiments. Steps were also taken to ensure that the supervisors actually conduct all the experiments. This involved arrangements for getting information of changes, if any, in the dates of harvest. In a few cases, a separate visit was actually found necessary to ascertain the harvesting dates.

11.3 A visit was paid to the village to observe actual conduct of experiments for checking accuracy of the field work and getting weight of the green crop at harvest stage. The green crop at harvest stage consisted of cobs for jowar (kharif and rabi), bajra and maize; ear-heads for ragi; plants for jute; cane for sugarcane; grain for wheat, gram and barley; grain for linseed in Madhya Pradesh, Rajasthan and Uttar Pradesh and plants in Mysore; and grain for rape & mustard. For obtaining the weight of grain, sometimes prolonged stay in the sample village or another visit at the time of threshing and getting weight was involved. Some times the dates of harvesting of two experiments in a village were different and some times the harvesting dates were changed at the last minute owing to vagaries of weather or convenience of cultivators. In such cases, more than one visit had to be paid to the village at the harvest stage.

11.4 In Kharif 1960-61 if the village selected for the spot check also belonged to the sub-sample of villages selected for operations in the State series, then the supervisor was required to pay a subsequent visit for observing these operations also. As the Central Driage Experiments at Delhi during 1962-63, it was decided not to pay a special visit for driage experiments during 1962-63 except for jute (Assam, Bihar, and Orissa). The details of number of visits paid, on an average, to a sample village at pre-harvest and harvest stages are given in Table 0.4 below:-

Table 0.4: Number of visits per village

| State | Average number of visits per village |         |       |
|-------|--------------------------------------|---------|-------|
|       | Pre-harvest                          | Harvest | Total |
| 1     | 2                                    | 3       | 4     |

Kharif

|                |     |     |     |
|----------------|-----|-----|-----|
| Andhra Pradesh | 0.4 | 1.0 | 1.4 |
| Assam          | 0.7 | 1.0 | 1.7 |

(Contd.)

Table 0.4 (Contd):

| State          | Average number of visits per village |         |       |
|----------------|--------------------------------------|---------|-------|
|                | Pre-harvest                          | Harvest | Total |
| 1              | 2                                    | 3       | 4     |
| Bihar          | 0.7                                  | 1.0     | 1.7   |
| Gujerat        | 1.1                                  | 1.2     | 2.3   |
| Madhya Pradesh | 0.9                                  | 1.0     | 1.9   |
| Madras         | 1.4                                  | 1.3     | 2.7   |
| Maharashtra    | 0.9                                  | 1.9     | 2.8   |
| Mysore         | 1.2                                  | 1.2     | 2.4   |
| Orissa         | 0.4                                  | 1.2     | 1.6   |
| Punjab         | 0.8                                  | 1.2     | 2.0   |
| Rajasthan      | 0.9                                  | 1.1     | 2.0   |
| Uttar Pradesh  | 0.1                                  | 1.4     | 1.5   |
| Total          | 0.8                                  | 1.1     | 1.9   |

Rabi

|                 |     |     |     |
|-----------------|-----|-----|-----|
| Andhra Pradesh  | 0.0 | 1.0 | 1.0 |
| Assam           | -   | 1.4 | 1.4 |
| Bihar           | 0.7 | 1.1 | 1.8 |
| Gujerat         | 0.9 | 1.2 | 2.1 |
| Jammu & Kashmir | 0.6 | 1.3 | 1.9 |
| Madhya Pradesh  | 0.7 | 1.6 | 2.3 |
| Maharashtra     | 0.8 | 1.3 | 2.1 |
| Mysore          | 0.4 | 1.1 | 1.5 |
| Punjab          | 1.0 | 2.3 | 3.3 |
| Rajasthan       | 0.8 | 2.3 | 3.1 |
| Uttar Pradesh   | -   | 1.3 | 1.3 |
| Total           | 0.5 | 1.4 | 1.9 |

11.5 The programme of work thus generally involved, on an average, about 2 visits to a sample village. The number of visits per village was the highest, namely, 2.8 in Maharashtra and 3.3 in Punjab during Kharif and Rabi respectively. It was the lowest, namely, 1.4 and 1.0 both in Andhra Pradesh during Kharif and Rabi respectively.

11.6 According to past experience, a supervisor is required to spend, on an average, about 2 days for each visit to a village.

11.7 In addition to the inspection at harvest stage of a State experimental cut, the supervisors were also required to take yield observations with the help of a circular cut (radius 4') instrument on a sub-sample of fields to compare the yields obtained



results relating to circular cuts have been discussed in a separate report\*. It may be mentioned that during the spare time available to the supervisors, in the course of inspection at harvest stage, they inspected crop cutting experiments outside the present programme and also collected some data on acreage enumeration by the State Revenue agencies.

## 12. Formation of zones

12.1 While formulating the programme of work, encouraged by the experience of earlier years, it was considered desirable to form compact zones (not necessarily non-overlapping) each consisting of 6 to 8 sample villages to be assigned to one supervisor. The formation of these zones was naturally based on the consideration of harvesting period, location of sample points and transport facilities available. By and large, this arrangement was found workable. It had, however, to be kept flexible to enable suitable decisions to be taken from the control room at the regional office for making necessary changes on the basis of the dates of harvesting or changes in the same received from time to time from various sample points.

## 13. Problems faced in the execution of the programme

13.1 The major problem faced in the execution of harvest stage inspection programme, like the earlier years, was the disturbance caused by sudden changes in the dates of harvesting; though, as usual, these were fixed earlier in consultation with the cultivators, etc. On account of this, there is considerable risk of losing observation at sample harvest. This was kept to the minimum by maintaining a close touch with the cultivators, local officials and some

agents in the

\*1.3. the extent of this problem can be had  
at on circular cuts conducted by the NSS supervisors  
Agricultural Statistics Division, 1962-63.

from the fact that in nearly half of the number of cases the originally fixed harvesting dates had to be changed. The percentage of the experiments, separately for each crop for which the dates had to be changed, were as under:-

| Crop               | Percentage of expts. where harvest date was changed | Crop               | Percentage of expts. where harvest date was changed |
|--------------------|---|--------------------|---|
|                    | <u>Kharif</u>                                       |                    | <u>Rabi</u>   |
| K. Jowar           | 67  | Wheat              | 49  |
| Bajra              | 52  | Gram               | 45  |
| Maize              | 36  | Barley             | 35  |
| Ragi               | 69  | R. Jowar           | 66  |
| Sugarcane          | 38  | Linseed            | 42  |
| Jute               | 33  | Rape & Mustard     | 30  |
| All crops combined | 50  | All crops combined | 47  |

13.2 On the other hand, some times there were gaps (i) between harvesting dates of two successive experiments, and (ii) between harvesting and threshing operations for the same experiment. As stated earlier, these gaps were utilized for carrying out other items of work. But the other items of work had to be done only after ensuring that the work of the main programme did not suffer.

#### 14. Period of field work

14.1 The field work began in each state about 2 weeks before the harvesting season of the crops covered in the State and came to a close as soon as the harvesting season was over except in Assam, Bihar and Orissa where jute was covered. In these three states, since inspection of drirage experiments on jute was also planned, the field work for jute crop continued about 2-3 weeks after the harvesting season. In most of the states of northern India harvesting season was spread over nearly 3 months in Kharif and nearly 2 months in Rabi season. In between the two seasons there was a gap of about

1 - 2 months. In southern states, however, the harvesting season of Kharif crops was spread over 4 - 5 months. Table 0.5 below gives the main harvesting periods of the crops covered by the programme :-

Table 0.5: Main harvesting periods to the nearest weekKharif - Food crops

| State          | Duration   | In. Jowar     |            | Bajra         |           | Maize          |           | Ragi          |            |
|----------------|------------|---------------|------------|---------------|-----------|----------------|-----------|---------------|------------|
|                |            | Month         | Week       | Month         | Week      | Month          | Week      | Month         | Week       |
| 1              | 2          | 3             | 4          | 5             | 6         | 7              | 8         | 9             | 10         |
| Andhra Pradesh | From<br>To | Sept.<br>Dec. | IV<br>III  | Sept.<br>Oct. | I<br>IV   | -<br>-         | -<br>-    | Sept.<br>Nov. | II<br>II   |
| Bihar          | From<br>To | -<br>-        | -<br>-     | -<br>-        | -<br>-    | Sept.<br>Sept. | I<br>IV   | -<br>-        | -<br>-     |
| Gujerat        | From<br>To | Oct.<br>Dec.  | II<br>I    | Sept.<br>Oct. | III<br>IV | -<br>-         | -<br>-    | -<br>-        | -<br>-     |
| Madhya Pradesh | From<br>To | Nov.<br>Dec.  | III<br>III | Sept.<br>Oct. | IV<br>IV  | Sept.<br>Oct.  | IV<br>III | -<br>-        | -<br>-     |
| Madras         | From<br>To | Dec.<br>Jan   | I<br>I     | Oct.<br>Feb.  | II<br>IV  | -<br>-         | -<br>-    | Sept.<br>Dec. | III<br>III |
| Maha-rashtra   | From<br>To | Nov.<br>Jan.  | II<br>I    | Sept.<br>Oct. | IV<br>IV  | -<br>-         | -<br>-    | -<br>-        | -<br>-     |
| Mysore         | From<br>To | Oct.<br>Dec.  | IV<br>II   | -<br>-        | -<br>-    | -<br>-         | -<br>-    | Oct.<br>Dec.  | IV<br>II   |
| Punjab         | From<br>To | -<br>-        | -<br>-     | -<br>-        | -<br>-    | Sept.<br>Oct.  | III<br>IV | -<br>-        | -<br>-     |
| Rajas-<br>than | From<br>To | Nov.<br>Dec.  | II<br>II   | Sept.<br>Oct. | IV<br>IV  | Sept.<br>Oct.  | IV<br>III | -<br>-        | -<br>-     |
| Uttar Pradesh  | From<br>To | Nov.<br>Dec.  | I<br>I     | Oct.<br>Nov.  | I<br>II   | Sept.<br>Oct.  | II<br>II  | -<br>-        | -<br>-     |

Rabi - Food crops

| State          | Duration   | Wheat          |           | Gram           |           | Barley         |           | In. Jowar     |           |
|----------------|------------|----------------|-----------|----------------|-----------|----------------|-----------|---------------|-----------|
|                |            | Month          | Week      | Month          | Week      | Month          | Week      | Month         | Week      |
| 1              | 2          | 3              | 4         | 5              | 6         | 7              | 8         | 9             | 10        |
| Andhra Pradesh | From<br>To | -<br>-         | -<br>-    | -<br>-         | -<br>-    | -<br>-         | -<br>-    | Jan.<br>March | II<br>III |
| Bihar          | From<br>To | March<br>April | III<br>II | March<br>April | III<br>II | March<br>April | III<br>II | -<br>-        | -<br>-    |

(Contd.)

Rabi - Food Crops (Contd.)

| State           | Duration   | Wheat          |           | Gram           |            | Berley         |          | R. Jowar      |         |
|-----------------|------------|----------------|-----------|----------------|------------|----------------|----------|---------------|---------|
|                 |            | Month          | Week      | Month          | Week       | Month          | Week     | Month         | Week    |
| 1               | 2          | 3              | 4         | 5              | 6          | 7              | 8        | 9             | 10      |
| Gujerat         | From<br>To | Feb.<br>March  | II<br>III | -<br>-         | -<br>-     | -<br>-         | -<br>-   | -<br>-        | -<br>-  |
| Jammu & Kashmir | From<br>To | April<br>June  | II<br>IV  | -<br>-         | -<br>-     | -<br>-         | -<br>-   | -<br>-        | -<br>-  |
| Madhya Pradesh  | From<br>To | March<br>April | I<br>IV   | March<br>March | I<br>IV    | March<br>March | I<br>IV  | -<br>-        | -<br>-  |
| Maha-rashtra    | From<br>To | Feb.<br>March  | I<br>I    | -<br>-         | -<br>-     | -<br>-         | -<br>-   | Jan.<br>March | IV<br>I |
| Mysore          | From<br>To | Jan.<br>Feb.   | II<br>II  | -<br>-         | -<br>-     | -<br>-         | -<br>-   | Jan.<br>March | IV<br>I |
| Punjab          | From<br>To | March<br>April | II<br>II  | March<br>April | III<br>III | March<br>April | IV<br>II | -<br>-        | -<br>-  |
| Rajas- than     | From<br>To | March<br>April | I<br>II   | March<br>March | I<br>IV    | March<br>April | II<br>I  | -<br>-        | -<br>-  |
| Uttar Pradesh   | From<br>To | March<br>April | II<br>II  | March<br>April | III<br>II  | March<br>April | II<br>I  | -<br>-        | -<br>-  |

Non-Food Crops

| State          | Duration   | Kharif        |          |               |           | Rabi           |          |                |           |
|----------------|------------|---------------|----------|---------------|-----------|----------------|----------|----------------|-----------|
|                |            | Sugar cane    |          | Jute          |           | Linseed        |          | Rape & Mustard |           |
|                |            | Month         | Week     | Month         | Week      | Month          | Week     | Month          | Week      |
| 1              | 2          | 3             | 4        | 5             | 6         | 7              | 8        | 9              | 10        |
| Andhra Pradesh | From<br>To | Jan.<br>April | III<br>I | -<br>-        | -<br>-    | -<br>-         | -<br>-   | -<br>-         | -<br>-    |
| Assam          | From<br>To | -<br>-        | -<br>-   | Aug.<br>Sept. | I<br>II   | -<br>-         | -<br>-   | Jan.<br>Feb.   | III<br>II |
| Bihar          | From<br>To | Dec.<br>Feb.  | IV<br>I  | Aug.<br>Sept. | II<br>III | -<br>-         | -<br>-   | -<br>-         | -<br>-    |
| Madhya Pradesh | From<br>To | -<br>-        | -<br>-   | -<br>-        | -<br>-    | Feb.<br>March  | IV<br>II | -<br>-         | -<br>-    |
| Madras         | From<br>To | Dec.<br>April | IV<br>I  | -<br>-        | -<br>-    | -<br>-         | -<br>-   | -<br>-         | -<br>-    |
| Mysore         | From<br>To | Dec.<br>March | IV<br>II | -<br>-        | -<br>-    | Feb.<br>Feb.   | I<br>IV  | -<br>-         | -<br>-    |
| Orissa         | From<br>To | -<br>-        | -<br>-   | Aug.<br>Sept. | II<br>II  | -<br>-         | -<br>-   | -<br>-         | -<br>-    |
| Punjab         | From<br>To | Dec.<br>Jan.  | IV<br>IV | -<br>-        | -<br>-    | -<br>-         | -<br>-   | Feb.<br>March  | IV<br>IV  |
| Rajas- than    | From<br>To | -<br>-        | -<br>-   | -<br>-        | -<br>-    | March<br>March | I<br>III | Feb.<br>March  | IV<br>III |
| Uttar Pradesh  | From<br>To | Dec.<br>Jan.  | II<br>IV | -<br>-        | -<br>-    | March<br>March | I<br>IV  | Feb.<br>March  | II<br>III |

## 15. Response

15.1 Over-all response : Of the total number of 2,056 experiments proposed, as many as 1,866 (91 per cent) experiments were spot checked at harvest stage completely. State-wise and crop-wise details are given in Table 1 appended. The number of experiments inspected for groups of crops put together are given below:-

|                         | Planned      | Inspected    | Percentage inspected |
|-------------------------|--------------|--------------|----------------------|
| Kharif - Food crops     | 920          | 850          | 92                   |
| Kharif - Non-food crops | 256          | 232          | 91                   |
| Kharif - All crops      | 1,176        | 1,082        | 92                   |
| Rabi - Food crops       | 710          | 652          | 92                   |
| Rabi - Non-food crops   | 170          | 132          | 78                   |
| Rabi - All crops        | 880          | 784          | 89                   |
| <b>Total</b>            | <b>2,056</b> | <b>1,866</b> | <b>91</b>            |

It will be seen from Table 1 that the number of experiments inspected was generally more than 90 per cent for each food crops. The percentage of experiments inspected was also satisfactory for sugarcane, jute and linseed. It was only in the case of rape & mustard that the loss of experiments was rather high i.e. nearly 28 per cent.

15.2 A substitution would take place if the field, which had been selected according to the procedures laid down, was found harvested at the time of selection. Since this can affect the results, special care was taken to see that the percentage of such cases was the bare minimum. Of the experiments inspected in Kharif, in about 5 per cent cases, sample harvesting was done in the fields substituted for the initially selected random fields. For Rabi crops, the percentage of such cases was rather high (12 per cent)

mainly on account of large scale substitutions in Bihar. State-wise and crop-wise details of substitutions are given in Table 1 appended.

15.3 It has been pointed out in para 11.4 above that special visits to the sub-sample of villages selected for driage operations were not undertaken in 1962-63. The Directorate, however, as in earlier years, arranged for some driage experiments on food crops to be done centrally at Delhi under controlled conditions. For this purpose, the produce of circular cuts, referred to in para 11.7 above, was sent to Delhi directly from the field.

15.4 In addition to state-wise and crop-wise details regarding response and substitutions, the number of driage experiments conducted centrally are also given in Table 1 appended. Some details of the procedures followed in Central Driage Experiments at Delhi along with the driage ratios used for this report are given in appendix II. A detailed report\* on Central Driage Experiments, 1962-63, has also been brought out.

### 16. Estimation procedure

16.1 In the crop estimation surveys in States, sample fields for a specified crop in a village are selected from the fields growing that crop irrespective of whether that crop alone is sown in a field (pure) or it is sown in mixture with other crops (mixed). The estimate of average yield rate worked out by taking the sample yields as directly obtained from the cuts irrespective of whether a cut was from a pure field or a mixed one is termed as the gross yield rate. If plot yields from mixed fields are

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\*A.3.6- Report on Central Driage Experiments, 1962-63.

divided by the corresponding proportion of area under the crop in the field obtained by eye estimation and then added to the plot yields from all the plots with pure crop the resulting estimate of average yield is termed as the net yield rate.

16.2 From the data of experiments inspected under the programme, state-wise gross and net yield rates were obtained together with the standard errors of the net yield rates. The yield rate of a crop at State level was obtained as a simple average in terms of green produce and then multiplied with the corresponding drilage ratio. It has been pointed out above that central drilage experiments were organized at Delhi on food crops during 1962-63. The drilage ratios for food crops, based on adequate number of central drilage experiments (nearly 10 or more at state level) wherever available, were made use of. In the remaining cases and for non-food crops the latest drilage ratios received from the states were used. The state drilage results for the year 1962-63 are also now available in some cases, but in view of a fairly close agreement between the drilage ratios actually used and those available for 1962-63, no attempt was made to modify the yield rates.

16.3 The yield rates in terms of dried grain were pooled over states by using the respective crop areas as weights. The standard errors of the estimates were obtained from the usual formula for two stage simple random sampling.

## 17. Results.

17.1 Table 0.6 below gives state-wise and crop-wise net yield rates based on experiments inspected under the present programme. The yield rates are in terms of dried grain for all food crops, linseed and rape & mustard; cane for sugarcane; and dry fibre for jute.

Table 0.6: Net yield rates (dried grain lbs./acre)Kharif - Food crops

| State          | Kharif Jowar  |            |        | Bajra         |            |        | Maize         |            |        | Ragi          |            |        |
|----------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. |
| 1              | 2             | 3          | 4      | 5             | 6          | 7      | 8             | 9          | 10     | 11            | 12         | 13     |
| Andhra Pradesh | 38            | 262        | 16.3   | 17            | 386        | 38.6   | -             | -          | -      | 36            | 607        | 12.6   |
| Bihar          | -             | -          | -      | -             | -          | -      | 46            | 972        | 9.7    | -             | -          | -      |
| Gujarat        | 32            | 429        | 21.4   | 39            | 495        | 17.0   | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh | 39            | 596        | 12.0   | 20            | 354        | 22.4   | 33            | 870        | 13.4   | -             | -          | -      |
| Madras         | 19            | 738        | 36.7   | 11            | 531        | 24.3   | -             | -          | -      | 30            | 2148       | 11.3   |
| Maharashtra    | 60            | 605        | 13.5   | 46            | 266        | 18.9   | -             | -          | -      | -             | -          | -      |
| Mysore         | 20            | 459        | 23.5   | -             | -          | -      | -             | -          | -      | 48            | 830        | 7.7    |
| Punjab         | -             | -          | -      | -             | -          | -      | 60            | 769        | 16.0   | -             | -          | -      |
| Rajasthan      | 31            | 410        | 24.0   | 58            | 183        | 23.2   | 38            | 799        | 11.6   | -             | -          | -      |
| Uttar Pradesh  | 42            | 441        | 16.2   | 35            | 706        | 12.4   | 54            | 990        | 11.4   | -             | -          | -      |
| States covered | 276           | 500        | 7.1    | 229           | 316        | 8.7    | 231           | 903        | 5.5    | 114           | 860        | 5.8    |



Table 0.6 (Contd.):

Rabi - Food crops

| State           | Wheat         |            |        | Gram          |            |        | Barley        |            |        | Rabi Jowar    |            |        |
|-----------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                 | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. |
| 1               | 2             | 3          | 4      | 5             | 6          | 7      | 8             | 9          | 10     | 11            | 12         | 13     |
| Andhra Pradesh  | -             | -          | -      | -             | -          | -      | -             | -          | -      | 48            | 290        | 15.1   |
| Bihar           | 20            | 577        | 17.1   | 27            | 475        | 16.5   | 30            | 489        | 14.1   | -             | -          | -      |
| Gujarat         | 27            | 582        | 18.0   | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Jammu & Kashmir | 19            | 593        | 12.4   | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh  | 23            | 621        | 7.7    | 15            | 424        | 19.5   | 16            | 537        | 30.0   | -             | -          | -      |
| Maharashtra     | 29            | 493        | 7.6    | -             | -          | -      | -             | -          | -      | 50            | 418        | 12.0   |
| Mysore          | 12            | 386        | 39.3   | -             | -          | -      | -             | -          | -      | 25            | 266        | 25.1   |
| Punjab          | 50            | 727        | 9.0    | 30            | 568        | 15.3   | 20            | 623        | 25.9   | -             | -          | -      |
| Rajasthan       | 29            | 791        | 20.1   | 30            | 277        | 19.5   | 29            | 1214       | 17.3   | -             | -          | -      |
| Uttar Pradesh   | 55            | 711        | 9.5    | 24            | 390        | 23.8   | 31            | 328        | 16.0   | -             | -          | -      |
| States covered  | 274           | 678        | 4.7    | 126           | 430        | 9.6    | 129           | 822        | 10.5   | 125           | 359        | 9.6    |

Table O.6 (Contd.):

Khharif & Rabi - Non-food crops

| State          | Sugarcane*    |            |        | Jute <sup>2</sup> |            |        | Linsed        |            |        | Rape & Mustard |            |        |
|----------------|---------------|------------|--------|-------------------|------------|--------|---------------|------------|--------|----------------|------------|--------|
|                | No. of expts. | Yield rate | % S.E. | No. of expts.     | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts.  | Yield rate | % S.E. |
| 1              | 2             | 3          | 4      | 5                 | 6          | 7      | 8             | 9          | 10     | 11             | 12         | 13     |
| Andhra Pradesh | 17            | 31.3       | 13.3   | -                 | -          | -      | -             | -          | -      | -              | -          | -      |
| Assam          | -             | -          | -      | 18                | 627        | 15.0   | -             | -          | -      | 12             | 157        | 25.6   |
| Bihar          | 28            | 11.1       | 14.5   | 42                | 936        | 7.8    | -             | -          | -      | -              | -          | -      |
| Madhya Pradesh | -             | -          | -      | -                 | -          | -      | 19            | 238        | 25.9   | -              | -          | -      |
| Madras         | 14            | 21.4       | 9.4    | -                 | -          | -      | -             | -          | -      | -              | -          | -      |
| Mysore         | 14            | 25.1       | 19.1   | -                 | -          | -      | 16            | 400        | 19.0   | -              | -          | -      |
| Orissa         | -             | -          | -      | 34                | 948        | 6.2    | -             | -          | -      | -              | -          | -      |
| Punjab         | 30            | 10.8       | 15.8   | -                 | -          | -      | -             | -          | -      | 19             | 567        | 19.9   |
| Rajasthan      | -             | -          | -      | -                 | -          | -      | 18            | 211        | 19.8   | 17             | 292        | 26.1   |
| Uttar Pradesh  | 35            | 11.9       | 8.3    | -                 | -          | -      | 14            | 154        | 21.8   | 17             | 448        | 21.8   |
| States covered | 138           | 13.3       | 5.7    | 94                | 848        | 5.4    | 67            | 208        | 15.0   | 65             | 433        | 17.2   |

\*in terms of cane tons/acre.

@in terms of dried fibre lbs./acre.

17.2 The results suggest the following observations:-

(i) The yield rates at all India level i.e. for the area covered, have been estimated with standard errors of the order of 5 per cent for wheat and jute; 6 per cent for maize, ragi and sugarcane; 7 per cent for Kharif jowar; 9 per cent for bajra; 10 per cent for gram, barley and Rabi jowar, 16 per cent for linseed; and 17 per cent for rape & mustard. Covering all the food crops and states together, the combined yield rate (by using appropriately the respective areas as weights) was estimated with standard error of the order of 4 per cent. This is a quite satisfactory result indicating thereby the practical value of the programme.

(ii) The spot check was not aimed at providing state level estimates as the spread of the sample over states would suggest. The standard errors of yield estimates are, therefore, rather high at this level. Nevertheless, the yield has been estimated with standard error less than 10 per cent at the state level for maize in Bihar; ragi in Orissa; wheat in Madhya Pradesh, Maharashtra, Punjab and Uttar Pradesh; sugarcane in Madras and Uttar Pradesh, and jute in Bihar and Orissa.

(iii) Considering food crops, the yield estimate per acre is of the order of 800-900 lbs. for maize, ragi, and jowar (Kharif); 700 lbs. for wheat; 400-500 lbs. for jowar (Kharif and Rabi) and gram; and nearly 300 lbs. for bajra. It is of the order of 800 lbs. for jute (dry fibre) and 13 tons for sugarcane (cane).

Comparison with yield rates from the State series:

In order to compare the yield rates obtained from the present harvest stage inspection programme with the

17.2 The results suggest the following observations:-

(i) The yield rates at all India level i.e. for the states covered, have been estimated with standard errors of the order of 5 per cent for wheat and jute; 6 per cent for maize, ragi and sugarcane; 7 per cent for Kharif jowar; 9 per cent for bajra; 10 per cent for gram, barley and Rabi jowar, 16 per cent for linseed; and 17 per cent for rape & mustard. Covering all the food crops and states together, the combined yield rate (by using appropriately the respective areas as weights) was estimated with standard error of the order of 4 per cent. This is a quite satisfactory result indicating thereby the practical value of the programme.

(ii) The spot check was not aimed at providing state level estimates as the spread of the sample over states would suggest. The standard errors of yield estimates are, therefore, rather high at this level. Nevertheless, the yield has been estimated with standard error less than 10 per cent at the state level for maize in Bihar; ragi in Mysore; wheat in Madhya Pradesh, Maharashtra, Punjab and Uttar Pradesh; sugarcane in Madras and Uttar Pradesh; and jute in Bihar and Orissa.

(iii) Considering food crops, the yield estimate per acre is of the order of 800-900 lbs. for maize, ragi, and barley; 700 lbs. for wheat; 400-500 lbs. for jowar (Kharif and Rabi) and gram; and nearly 300 lbs. for bajra. It is of the order of 800 lbs. for jute (dry fibre) and 13 tons for sugarcane (cane).

17.3 Comparison with yield rates from the State series:

It would be interesting to compare the yield rates obtained from the present harvest stage inspection programme with the

corresponding yield estimates obtained from the State series. The estimates of yield rates from the state series are presented in Table 0.7 below together with the corresponding results of harvest stage inspection. It may be noted that the plot yields from the fields selected for the present inspection programme have been included in the State tabulation in obtaining estimates for the state series.

Table 0.7: Comparison of yield rates (Net)

| State | Net yield rates lbs./acre        |                                  | Percentage difference  |
|-------|----------------------------------|----------------------------------|--|
|       | State series<br>Final<br>1962-63 | Harvest<br>inspection<br>1962-63 | $\frac{\text{Col. (2)} - \text{Col. (3)}}{\text{Col. (2)}} \times 100$ |
| 1     | 2                                | 3                                | 4  |

Kharif - Food crops

KHARIF JOWAR

|                |     |     |       |
|----------------|-----|-----|-------|
| Andhra Pradesh | 524 | 262 | 50.0  |
| Gujarat        | 251 | 429 | -70.9 |
| Madhya Pradesh | 647 | 596 | 7.9   |
| Madras         | 598 | 788 | -31.8 |
| Maharashtra    | 513 | 605 | -17.9 |
| Mysore         | 555 | 459 | 17.3  |
| Rajasthan      | 314 | 410 | -30.6 |
| Uttar Pradesh  | 597 | 441 | 26.1  |
| States covered | 506 | 500 | 1.2   |

BAJRA

|                |      |     |       |
|----------------|------|-----|-------|
| Andhra Pradesh | 517  | 386 | 25.3  |
| Gujarat        | 349  | 495 | -41.8 |
| Madhya Pradesh | 595  | 354 | 40.5  |
| Madras         | 567* | 331 | 41.8  |
| Maharashtra    | 300  | 266 | 11.3  |
| Rajasthan      | 205  | 183 | 10.7  |
| Uttar Pradesh  | 536  | 706 | -31.7 |
| States covered | 320  | 316 | 1.2   |

(Contd.)

| 1                        | 2    | 3    | 4     |
|--------------------------|------|------|-------|
| <u>MAIZE</u>             |      |      |       |
| Bihar                    | 945  | 978  | - 3.5 |
| Madhya Pradesh           | 851  | 870  | - 2.2 |
| Punjab                   | 814* | 769  | 5.5   |
| Rajasthan                | 979  | 799  | 18.4  |
| Uttar Pradesh            | 828  | 990  | -19.7 |
| States covered           | 884  | 903  | - 2.1 |
| <u>RAGI</u>              |      |      |       |
| Andhra Pradesh           | 771  | 607  | 21.3  |
| Madras                   | 900* | 1148 | -27.6 |
| Mysore                   | 784  | 830  | - 5.9 |
| States covered           | 808  | 860  | - 6.4 |
| <u>Rabi - Food crops</u> |      |      |       |
| <u>WHEAT</u>             |      |      |       |
| Bihar                    | 660  | 577  | 12.6  |
| Gujarat                  | 664  | 582  | 12.3  |
| Jammu & Kashmir          | 475  | 593  | -24.8 |
| Madhya Pradesh           | 616  | 624  | - 1.3 |
| Maharashtra              | 451  | 493  | - 9.3 |
| Mysore                   | 259  | 386  | -49.0 |
| Punjab                   | 1021 | 797  | 21.9  |
| Rajasthan                | 779  | 791  | - 1.5 |
| Uttar Pradesh            | 702  | 711  | - 1.3 |
| States covered           | 709  | 678  | 4.4   |
| <u>GRAM</u>              |      |      |       |
| Bihar                    | 493  | 475  | 3.7   |
| Madhya Pradesh           | 536  | 424  | 20.9  |
| Punjab                   | 595  | 568  | 2.9   |
| Rajasthan                | 448  | 277  | 33.2  |
| Uttar Pradesh            | 560  | 390  | 30.4  |
| States covered           | 538  | 430  | 20.1  |
| <u>BARLEY</u>            |      |      |       |
| Bihar                    | 514  | 489  | 4.9   |
| Madhya Pradesh           | 650  | 537  | 17.4  |
| Punjab                   | 726  | 628  | 13.5  |
| Rajasthan                | 978  | 1214 | -24.1 |
| Uttar Pradesh            | 709  | 823  | -16.8 |
| States covered           | 723  | 822  | -13.9 |

(Contd.)

| 1   | 2    | 3    | 4     |
|---|------|------|-------|
| <u>RABI JOWAR</u>                         |      |      |       |
| Andhra Pradesh                            | 450  | 299  | 33.6  |
| Maharashtra                               | 433  | 418  | 3.5   |
| Mysore                                    | 335  | 268  | 20.6  |
| States covered                            | 410  | 259  | 12.4  |
| <u>Kharii &amp; Rabi - Non-food crops</u> |      |      |       |
| <u>SUGARCANE</u>                          |      |      |       |
| Andhra Pradesh                            | 31.7 | 31.3 | 1.3   |
| Bihar                                     | 12.0 | 11.1 | 7.5   |
| Madras                                    | 32.1 | 21.4 | 33.3  |
| Mysore                                    | 34.0 | 25.1 | 26.2  |
| Punjab                                    | 12.8 | 10.8 | 15.6  |
| Uttar Pradesh                             | 13.6 | 11.9 | 12.5  |
| States covered                            | 15.4 | 13.3 | 13.6  |
| <u>JUTE@</u>                              |      |      |       |
| Assam                                     | 832  | 627  | 24.6  |
| Bihar                                     | 852  | 936  | -9.9  |
| Orissa                                    | 1005 | 948  | 5.7   |
| States covered                            | 884  | 848  | 4.1   |
| <u>LINSEED</u>                            |      |      |       |
| Madhya Pradesh                            | 210  | 233  | -13.3 |
| Mysore                                    | 166  | 400  | -41.0 |
| Rajasthan                                 | 224  | 211  | 5.8   |
| Uttar Pradesh                             | 165  | 151  | 6.7   |
| States covered                            | 191  | 295  | - 8.9 |
| <u>RAPE &amp; MUSTARD</u>                 |      |      |       |
| Assam                                     | 330  | 157  | 52.4  |
| Punjab                                    | 387  | 567  | -46.5 |
| Rajasthan                                 | 368  | 292  | 20.7  |
| Uttar Pradesh                             | 350  | 448  | -28.0 |
| States covered                            | 355  | 483  | -22.0 |

\*Final forecast figures 1962-63.

£Yield rate in tons/acre of cane.

@Yield rate of dried fibre lbs./acre.

17.4 Comparing the inspection results with the State series results, it will be observed that at all India level i.e. for all the states covered, the differences were less than 5 per cent for Kharif jowar, bajra, maize, wheat and jute; between 5 per cent and 10 per cent for ragi and linseed; between 10 per cent and 20 per cent for gram, barley, Rabi jowar and sugarcane. The difference was rather very high (more than 20 per cent) for rape & mustard.

17.5 From the standard errors of the yield rates based on harvest stage inspection data alone, the differences do not appear to be statistically significant except in the case of gram and sugarcane.

17.6 Out of 62 comparisons in all at state level, the differences (State estimate - Central estimate) are negative in 24 cases and positive in 38 cases.

### 13. Classificatory analysis

13.1 Although the object of the programme was chiefly to estimate the yield per acre, information was collected on soil in ancillary items also, particularly with regard to soil cultivation practices. Further, provision was made to note whether a sample village belonged to Community Development Areas or was from outside these areas. The data were accordingly analysed for obtaining separately the estimates of gross and net yields for each of the two sub-categories of fields under the following five categories which could be of special practical interest :-

| <u>Category</u> | <u>Sub-categories</u>                                       |
|-----------------|---|
| (1)             | Irrigated, Un-irrigated.                                    |
| (2)             | Manured, Not manured.                                       |
| (3)             | Improved seed, Local seed.                                  |
| (4)             | Crops sown singly (Pure),<br>Crops sown in mixture (Mixed). |
| (5)             | Community Development Areas,<br>Non-development Areas.      |



The detailed state-wise and crop-wise results by categories are given in Table 2 appended. The summary results for individual crops at all India level i.e. for the states covered, are presented in Table 0.8 below :-

Table 0.8: Classificatory analysis - Yield rates (lbs/acre of dried grain)

| Crop                       | Category-1     |                       | Category-2    |                      | Category-3            |               | Category-4   |              | Category-5            |                          | Com-<br>bin-<br>ed |
|----------------------------|----------------|-----------------------|---------------|----------------------|-----------------------|---------------|--------------|--------------|-----------------------|--------------------------|--------------------|
|                            | Irri-<br>gated | Un-<br>irri-<br>gated | Man-<br>ured  | Not-<br>man-<br>ured | Imp-<br>roved<br>seed | Local<br>seed | Pure         | Mixed        | Deve-<br>lop-<br>ment | Non-<br>deve-<br>lopment |                    |
| 1                          | 2              | 3                     | 4             | 5                    | 6                     | 7             | 8            | 9            | 10                    | 11                       | 12                 |
| <u>Kharif - Food crops</u> |                |                       |               |                      |                       |               |              |              |                       |                          |                    |
| <u>GROSS</u>               |                |                       |               |                      |                       |               |              |              |                       |                          |                    |
| Kharif-<br>Jowar           | -              | -                     | 571<br>(56)   | 368<br>(220)         | -                     | -             | 327<br>(95)  | 443<br>(181) | 419<br>(211)          | 309<br>(65)              | 401<br>(276)       |
| Bajra                      | -              | -                     | 324<br>(45)   | 238<br>(134)         | -                     | -             | 330<br>(90)  | 248<br>(139) | 256<br>(158)          | 269<br>(71)              | 257<br>(229)       |
| Maize                      | 1259<br>(43)   | 773<br>(188)          | 1031<br>(125) | 574<br>(106)         | -                     | -             | 885<br>(185) | 761<br>(46)  | 860<br>(158)          | 805<br>(73)              | 834<br>(231)       |
| Ragi                       | 1133<br>(28)   | 661<br>(86)           | 827<br>(91)   | 670<br>(23)          | -                     | -             | 882<br>(60)  | 686<br>(54)  | 815<br>(75)           | 737<br>(39)              | 790<br>(114)       |
| <u>NET</u>                 |                |                       |               |                      |                       |               |              |              |                       |                          |                    |
| Kharif-<br>Jowar           | -              | -                     | 719<br>(53)   | 457<br>(220)         | -                     | -             | 327<br>(95)  | 506<br>(131) | 535<br>(211)          | 357<br>(65)              | 500<br>(276)       |
| Bajra                      | -              | -                     | 379<br>(45)   | 300<br>(184)         | -                     | -             | 330<br>(90)  | 368<br>(139) | 313<br>(158)          | 331<br>(71)              | 316<br>(229)       |
| Maize                      | 1363<br>(43)   | 841<br>(188)          | 1028<br>(125) | 664<br>(106)         | -                     | -             | 885<br>(185) | 1089<br>(46) | 941<br>(158)          | 847<br>(73)              | 901<br>(231)       |
| Ragi                       | 1142<br>(28)   | 742<br>(86)           | 849<br>(91)   | 712<br>(23)          | -                     | -             | 822<br>(60)  | 811<br>(54)  | 894<br>(75)           | 784<br>(39)              | 841<br>(114)       |
| <u>Rabi - Food crops</u>   |                |                       |               |                      |                       |               |              |              |                       |                          |                    |
| <u>GROSS</u>               |                |                       |               |                      |                       |               |              |              |                       |                          |                    |
| Wheat                      | 802<br>(110)   | 431<br>(164)          | 527<br>(137)  | 548<br>(237)         | 831<br>(62)           | 493<br>(212)  | 692<br>(173) | 470<br>(101) | 579<br>(198)          | 532<br>(75)              | 538<br>(271)       |
| Gram                       | 326<br>(31)    | 270<br>(95)           | 345<br>(101)  | 272<br>(113)         | -                     | -             | 344<br>(49)  | 254<br>(77)  | 306<br>(100)          | 171<br>(17)              | 298<br>(120)       |
| Barley                     | 825<br>(45)    | 460<br>(84)           | 527<br>(35)   | 517<br>(93)          | -                     | -             | 796<br>(63)  | 536<br>(66)  | 698<br>(104)          | 551<br>(25)              | 543<br>(117)       |
| Rabi-<br>Jowar             | -              | -                     | 480<br>(25)   | 307<br>(92)          | -                     | -             | 423<br>(67)  | 275<br>(56)  | 325<br>(90)           | 496<br>(24)              | 315<br>(123)       |

(Contd.)

Table 0.8 Contd.

|   | 1             | 2            | 3            | 4            | 5            | 6            | 7            | 8            | 9            | 10           | 11            | 12 |
|---|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----|
| <u>NET</u>                                |               |              |              |              |              |              |              |              |              |              |               |    |
| Wheat                                     | 863<br>(110)  | 533<br>(164) | 872<br>(87)  | 630<br>(187) | 906<br>(62)  | 592<br>(212) | 692<br>(173) | 691<br>(101) | 676<br>(128) | 593<br>(76)  | 678<br>(274)  |    |
| Gram                                      | 530<br>(31)   | 306<br>(95)  | 515<br>(13)  | 422<br>(113) | -            | -            | 344<br>(49)  | 468<br>(77)  | 455<br>(109) | 369<br>(17)  | 430<br>(126)  |    |
| Barley                                    | 1039<br>(45)  | 633<br>(84)  | 1086<br>(36) | 701<br>(93)  | -            | -            | 796<br>(63)  | 872<br>(66)  | 866<br>(104) | 647<br>(25)  | 822<br>(129)  |    |
| Rabi-<br>Jowar                            | -             | -            | 484<br>(25)  | 324<br>(98)  | -            | -            | 423<br>(67)  | 313<br>(56)  | 333<br>(99)  | 503<br>(24)  | 359<br>(123)  |    |
| <u>Kharif &amp; Rabi - Non-food crops</u> |               |              |              |              |              |              |              |              |              |              |               |    |
| <u>GROSS</u>                              |               |              |              |              |              |              |              |              |              |              |               |    |
| Sugar-<br>cane*                           | 13.8<br>(100) | 9.8<br>(38)  | 13.5<br>(98) | 10.7<br>(40) | 15.4<br>(83) | 11.9<br>(55) | -            | -            | 13.5<br>(96) | 12.6<br>(42) | 13.3<br>(138) |    |
| Jute**                                    | -             | -            | 855<br>(34)  | 810<br>(60)  | 936<br>(21)  | 852<br>(73)  | -            | -            | 822<br>(64)  | 862<br>(30)  | 847<br>(94)   |    |
| Linseed                                   | -             | -            | -            | -            | -            | -            | 190<br>(40)  | 123<br>(27)  | 206<br>(47)  | 70<br>(20)   | 163<br>(67)   |    |
| Rape &<br>Mustard                         | -             | -            | 438<br>(15)  | 385<br>(50)  | -            | -            | 427<br>(54)  | 75<br>(11)   | 400<br>(50)  | 325<br>(15)  | 399<br>(65)   |    |
| <u>NET</u>                                |               |              |              |              |              |              |              |              |              |              |               |    |
| Sugar-<br>cane†                           | 13.8<br>(100) | 9.8<br>(38)  | 13.5<br>(98) | 10.7<br>(40) | 15.4<br>(83) | 11.9<br>(55) | -            | -            | 13.5<br>(96) | 12.6<br>(42) | 13.3<br>(138) |    |
| Jute**                                    | -             | -            | 855<br>(31)  | 811<br>(60)  | 936<br>(21)  | 853<br>(73)  | -            | -            | 824<br>(64)  | 862<br>(30)  | 848<br>(94)   |    |
| Linseed                                   | -             | -            | -            | -            | -            | -            | 190<br>(40)  | 210<br>(27)  | 267<br>(47)  | 74<br>(20)   | 203<br>(67)   |    |
| Mustard                                   | -             | -            | 414<br>(15)  | 424<br>(50)  | -            | -            | 427<br>(54)  | 307<br>(11)  | 474<br>(50)  | 345<br>(15)  | 433<br>(65)   |    |

Note: Figures in brackets give the number of experiments.

\* Field rates in terms of tons/acre (can)

\*\* Yield rates in terms of baled fibre

12.2 It may be seen from the table above that the results have not been presented for all the crops under each category except for category (5). The reason for this is

that adequate number of observations for each of the two sub-categories were not available in such cases. For instance crops like jowar and bajra are mostly raised under un-irrigated conditions. Further, very few fields for all the crops, except wheat, sugarcane and jute, were observed to have been sown with improved seed. Before discussing the results, it may be pointed out that any differential effect seen with a particular classification is not necessarily the net effect of the factor entering into that classification but should rather be regarded as the combined effect of that and other possible factors as well.

18.3 Irrigated Vs. Un-irrigated: It may be seen that the yield rate obtained from irrigated fields was higher than the yield rate from the un-irrigated fields by about 500 lbs/acre for maize, 400 lbs/acre for ragi, 350 lbs/acre for wheat and barley, 100 lbs./acre for gram and by about 4 tons/acre for sugarcane.

18.4 Manured Vs. Not manured: The term "manure" here covers all fields where any of the manures, namely, farm-yard manure, fertilizers, compost, oilcakes or others were applied. For each crop, the yield rate obtained from the manured fields was considerably higher than the yield rate from the fields which were not manured.

18.5 Improved seed Vs. Local seed: The yield rate from the fields sown with improved seed was more than the yield rate from the fields sown with local seed by about 300 lbs./acre for wheat, about 1 tons/acre for sugarcane and about 100 lbs./acre for jute.

18.6 Crops sown pure Vs. Crops sown in mixture: The gross yield rates from the mixed sown fields are expected to be lower than the gross yield rates from the pure fields. This was observed to be so for all the crops except Kharif jowar. The net yield rates from the mixed fields (calculated by raising the gross yield in inverse proportion of the extent of that crop in the mixture) were observed to be of the same order as yield rates from pure fields for wheat. The former was lower than the latter for ragi, Rabi jowar and rape & mustard and higher for the remaining crops.

18.7 Development Vs. Non-development: Community Development Programme, with its emphasis on agricultural development in particular, was supposed to have covered about 70 per cent of the area in the country. Sample fields were, therefore, classified as those belonging to development areas and others. All blocks, started prior to 1st April, 1961, were, for this purpose, taken as constituting development areas, other blocks being merged with the rest of the country. This gave at least a year's time for the villages to come under the influence of the development programme. The results indicate that the yield rates for the development areas were somewhat higher than the yield rates for the rest of the country for all crops except bajra and jute. For all the food crops put together, the yield rate for the development areas was about 12 per cent higher than the corresponding yield rate for the rest of the country.

#### 19. Inspection by State staff

Concurrently with the harvest stage spot check

by the State staff (National Sample Survey)

supervisory staff the states were also requested to organize similar programme through their supervisory staff, particularly the statistical staff. In all, 13 states in Kharif and 4 states in Rabi (besides Delhi) responded. The programmes were organized on the principal crops accounting for in all about 3000 experiments in Kharif and about 400 experiments in Rabi.

## 20. General observations and conclusions

20.1 The anticipated distribution of experiments at the rate of 6 to 8 villages per supervisor per season or 12 to 13 villages per supervisor for the whole year seemed to be the maximum work-load that could be allotted to a supervisor taking into consideration the spread of harvesting season and facilities of communications.

20.2 This random central spot check has shown that the differences between the State series and the Central supervision results were very small for Kharif jowar, bajra, maize, wheat and jute. The differences for the remaining crops were somewhat high, i.e. generally more than 5 per cent. But these differences were statistically not significant for any crop except gram and sugarcane.

20.3 The percentage standard error of the yield rates based on the sample check data was, at all India level i.e. for the states covered, 5 per cent for wheat and jute, 6 per cent for maize, ragi and sugarcane; and between 7 to 10 per cent for the remaining food crops. The standard errors for linseed and rape & mustard were rather high, suggesting the need for increase in the scale of supervision on these crops by about 100 to 150 per cent to attain

sampling errors of reasonable order. For all the food crops and states put together, the combined yield rate was estimated with standard error of the order of 4 per cent.

20.4        The present Central check envisaged presence of the supervisory staff at the time of harvesting. For this the primary workers had to be intimated about the sample points where the supervisors were required to pay visits. This precludes the possibility of introducing any surprise element in the supervision. The random spot check is, therefore, supplementary to the supervision of the type undertaken in the past which throws light on the qualitative nature of the over-all data collected through State crop cutting experiments.

| State                         | J O W A R     |                |                      |          |                   |                                    | B A J R A     |                |                      |          |                   |                                    |
|-------------------------------|---------------|----------------|----------------------|----------|-------------------|------------------------------------|---------------|----------------|----------------------|----------|-------------------|------------------------------------|
|                               | No. of expts. |                | No. of substitutions |          |                   | No. of central<br>driage<br>expts. | No. of expts. |                | No. of substitutions |          |                   | No. of central<br>driage<br>expts. |
|                               | Pla-<br>nned  | Ins-<br>pected | Vil-<br>lage         | Expts.   | Total<br>(expts.) |                                    | Pla-<br>nned  | Ins-<br>pected | Vil-<br>lage         | Expts.   | Total<br>(expts.) |                                    |
| 1                             | 2             | 3              | 4                    | 5        | 6                 | 7                                  | 8             | 9              | 10                   | 11       | 12                | 13                                 |
| Andhra Pradesh                | 40            | 33             | -                    | -        | -                 | 12                                 | 20            | 17             | -                    | -        | -                 | 5                                  |
| Assam                         | -             | -              | -                    | -        | -                 | -                                  | -             | -              | -                    | -        | -                 | -                                  |
| Bihar                         | -             | -              | -                    | -        | -                 | -                                  | -             | -              | -                    | -        | -                 | -                                  |
| Gujerat                       | 40            | 32             | 1                    | -        | 2                 | 11                                 | 40            | 39             | -                    | 1        | 1                 | 20                                 |
| Madhya Pradesh                | 40            | 39             | -                    | 1        | 1                 | 19                                 | 20            | 20             | -                    | -        | -                 | 7                                  |
| Madras                        | 16            | 14             | 1                    | -        | 2                 | 4                                  | 20            | 14             | 1                    | -        | 2                 | 6                                  |
| Maharashtra                   | 60            | 60             | -                    | 6        | 6                 | 25                                 | 50            | 46             | 1                    | 4        | 6                 | 21                                 |
| Mysore                        | 20            | 20             | -                    | -        | -                 | 5                                  | -             | -              | -                    | -        | -                 | -                                  |
| Orissa                        | -             | -              | -                    | -        | -                 | -                                  | -             | -              | -                    | -        | -                 | -                                  |
| Punjab                        | -             | -              | -                    | -        | -                 | -                                  | -             | -              | -                    | -        | -                 | -                                  |
| Rajasthan                     | 32            | 31             | -                    | -        | -                 | 3                                  | 60            | 58             | -                    | 1        | 1                 | 19                                 |
| Uttar Pradesh                 | 50            | 42             | -                    | 1        | 1                 | 13                                 | 40            | 35             | -                    | 3        | 3                 | 12                                 |
| <b>Total (States covered)</b> | <b>298</b>    | <b>276</b>     | <b>2</b>             | <b>8</b> | <b>12</b>         | <b>92</b>                          | <b>250</b>    | <b>229</b>     | <b>2</b>             | <b>9</b> | <b>13</b>         | <b>90</b>                          |

Table 1 (Contd.)

| State                  | M A I Z E     |                |                      |        |                   |                                    | R A G I       |                |                      |        |                   |                                    |
|------------------------|---------------|----------------|----------------------|--------|-------------------|------------------------------------|---------------|----------------|----------------------|--------|-------------------|------------------------------------|
|                        | No. of expts. |                | No. of substitutions |        |                   | No. of central<br>driage<br>expts. | No. of expts. |                | No. of substitutions |        |                   | No. of central<br>driage<br>expts. |
|                        | Pla-<br>nned  | Ins-<br>pected | Vil-<br>lage         | Expts. | Total<br>(expts.) |                                    | Pla-<br>nned  | Ins-<br>pected | Vil-<br>lage         | Expts. | Total<br>(expts.) |                                    |
| 1                      | 14            | 15             | 16                   | 17     | 18                | 19                                 | 20            | 21             | 22                   | 23     | 24                | 25                                 |
| Andhra Pradesh         | -             | -              | -                    | -      | -                 | -                                  | 40            | 36             | 1                    | 2      | 4                 | 15                                 |
| Assam                  | -             | -              | -                    | -      | -                 | -                                  | -             | -              | -                    | -      | -                 | -                                  |
| Bihar                  | 50            | 46             | -                    | 5      | 5                 | 21                                 | -             | -              | -                    | -      | -                 | -                                  |
| Gujerat                | -             | -              | -                    | -      | -                 | -                                  | -             | -              | -                    | -      | -                 | -                                  |
| Madhya Pradesh         | 40            | 33             | -                    | -      | -                 | 13                                 | -             | -              | -                    | -      | -                 | -                                  |
| Madras                 | -             | -              | -                    | -      | -                 | -                                  | 32            | 30             | 2                    | 1      | 5                 | 9                                  |
| Maharashtra            | -             | -              | -                    | -      | -                 | -                                  | -             | -              | -                    | -      | -                 | -                                  |
| Mysore                 | -             | -              | -                    | -      | -                 | -                                  | 50            | 48             | -                    | 5      | 5                 | 18                                 |
| Orissa                 | -             | -              | -                    | -      | -                 | -                                  | -             | -              | -                    | -      | -                 | -                                  |
| Punjab                 | 60            | 60             | -                    | 2      | 2                 | 21                                 | -             | -              | -                    | -      | -                 | -                                  |
| Rajasthan              | 40            | 38             | -                    | -      | -                 | 13                                 | -             | -              | -                    | -      | -                 | -                                  |
| Uttar Pradesh          | 60            | 54             | -                    | 2      | 2                 | 20                                 | -             | -              | -                    | -      | -                 | -                                  |
| Total (States covered) | 250           | 231            | -                    | 9      | 9                 | 88                                 | 122           | 114            | 3                    | 8      | 14                | 42                                 |



| State                         | SUGARCANE     |                |                      |           |                   |                              | JUICE         |                |                      |          |                   |                              |
|-------------------------------|---------------|----------------|----------------------|-----------|-------------------|------------------------------|---------------|----------------|----------------------|----------|-------------------|------------------------------|
|                               | No. of expts. |                | No. of substitutions |           |                   | No. of central driage expts. | No. of expts. |                | No. of substitutions |          |                   | No. of central driage expts. |
|                               | Plan-<br>ned  | Ins-<br>pected | Vil-<br>lage         | Expts.    | Total<br>(expts.) |                              | Plan-<br>ned  | Ins-<br>pected | Vil-<br>lage         | Expts.   | Total<br>(expts.) |                              |
| 1                             | 26            | 27             | 28                   | 29        | 30                | 31                           | 32            | 33             | 34                   | 35       | 36                | 37                           |
| Andhra Pradesh                | 20            | 17             | -                    | 3         | 3                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Assam                         | -             | -              | -                    | -         | -                 | -                            | 20            | 13             | -                    | -        | -                 | -                            |
| Bihar                         | 30            | 28             | 2                    | 5         | 9                 | -                            | 44            | 42             | -                    | 4        | 4                 | -                            |
| Gujerat                       | -             | -              | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Madhya Pradesh                | -             | -              | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Madras                        | 16            | 14             | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Maharashtra                   | -             | -              | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Mysore                        | 20            | 14             | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Orissa                        | -             | -              | -                    | -         | -                 | -                            | 36            | 34             | -                    | -        | -                 | -                            |
| Punjab                        | 30            | 30             | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Rajasthan                     | -             | -              | -                    | -         | -                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| Uttar Pradesh                 | 40            | 35             | -                    | 2         | 2                 | -                            | -             | -              | -                    | -        | -                 | -                            |
| <b>Total (States covered)</b> | <b>156</b>    | <b>138</b>     | <b>2</b>             | <b>10</b> | <b>14</b>         | <b>-</b>                     | <b>100</b>    | <b>94</b>      | <b>-</b>             | <b>4</b> | <b>4</b>          | <b>-</b>                     |

Table 1(b): Number of experiments planned, inspected, substituted and central drriage experiments - Rabi 1962-63

| State                         | W H E A T     |            |                      |           |                |                               | G R A M       |            |                      |           |                |                               |
|-------------------------------|---------------|------------|----------------------|-----------|----------------|-------------------------------|---------------|------------|----------------------|-----------|----------------|-------------------------------|
|                               | No. of expts. |            | No. of substitutions |           |                | No. of central drriage expts. | No. of expts. |            | No. of substitutions |           |                | No. of central drriage expts. |
|                               | Planned       | Inspected  | Village              | Expts.    | Total (expts.) |                               | Planned       | Inspected  | Village              | Expts.    | Total (expts.) |                               |
| 1                             | 2             | 3          | 4                    | 5         | 6              | 7                             | 8             | 9          | 10                   | 11        | 12             | 13                            |
| Andhra Pradesh                | -             | -          | -                    | -         | -              | -                             | -             | -          | -                    | -         | -              | -                             |
| Assam                         | -             | -          | -                    | -         | -              | 9*                            | -             | -          | -                    | -         | -              | -                             |
| Bihar                         | 30            | 30         | -                    | 6         | 6              | 20**                          | 30            | 27         | 3                    | 10        | 16             | 13                            |
| Gujarat                       | 30            | 27         | -                    | -         | -              | 10*<br>15**                   | -             | -          | -                    | -         | -              | -                             |
| Jammu & Kashmir               | 20            | 17         | -                    | -         | -              | 10*<br>8**                    | -             | -          | -                    | -         | -              | -                             |
| Madhya Pradesh                | 30            | 23         | 1                    | -         | 2              | 8*<br>13**<br>14*             | 20            | 15         | 1                    | -         | 2              | 8                             |
| Maharashtra                   | 30            | 29         | -                    | 3         | 3              | 15**                          | -             | -          | -                    | -         | -              | -                             |
| Mysore                        | 20            | 12         | -                    | 2         | 2              | 8*<br>4**                     | -             | -          | -                    | -         | -              | -                             |
| Punjab                        | 50            | 50         | -                    | -         | -              | 18*<br>27**                   | 30            | 30         | -                    | -         | -              | 14                            |
| Rajasthan                     | 30            | 29         | -                    | -         | -              | 9*<br>18**                    | 30            | 30         | -                    | -         | -              | 10                            |
| Uttar Pradesh                 | 60            | 55         | 3                    | 4         | 10             | 22*<br>27**                   | 30            | 24         | 1                    | 2         | 4              | 9                             |
| <b>Total (States covered)</b> | <b>300</b>    | <b>274</b> | <b>4</b>             | <b>15</b> | <b>23</b>      | <b>108*<br/>147**</b>         | <b>140</b>    | <b>126</b> | <b>5</b>             | <b>12</b> | <b>22</b>      | <b>54</b>                     |

\*Harvested produce is in terms of Ear-heads.

\*\* Harvested produce is in terms of grain.

Table 1(b): (Contd..)

| State                  | B A R L E Y   |                |                      |                    | R A B I - J O W A |                                    |                      | No. of central dridge expts. |    |    |    |
|------------------------|---------------|----------------|----------------------|--------------------|-------------------|------------------------------------|----------------------|------------------------------|----|----|----|
|                        | No. of expts. |                | No. of substitutions |                    | No. of expts.     |                                    | No. of substitutions |                              |    |    |    |
|                        | Pla-<br>anned | Ins-<br>pected | Wil-<br>lage         | Expts.<br>(expts.) | Total<br>(expts.) | No. of central<br>dridge<br>expts. | Total<br>(expts)     |                              |    |    |    |
| 1                      | 11            | 15             | 16                   | 17                 | 18                | 20                                 | 21                   | 22                           | 23 | 24 | 25 |
| Uttar Pradesh          | -             | -              | -                    | -                  | -                 | 50                                 | 48                   | -                            | 1  | 1  | 13 |
| Assam                  | -             | -              | -                    | -                  | -                 | -                                  | -                    | -                            | -  | -  | -  |
| Bihar                  | 30            | 30             | -                    | 8                  | 8                 | -                                  | -                    | -                            | -  | -  | -  |
| Gujarat                | -             | -              | -                    | -                  | -                 | -                                  | -                    | -                            | -  | -  | -  |
| Jammu & Kashmir        | -             | -              | -                    | -                  | -                 | -                                  | -                    | -                            | -  | -  | -  |
| Madhya Pradesh         | 20            | 16             | 1                    | -                  | 2                 | -                                  | -                    | -                            | -  | -  | -  |
| Madhprashtra           | -             | -              | -                    | -                  | -                 | 50                                 | 50                   | -                            | 2  | 3  | 24 |
| Mysore                 | -             | -              | -                    | -                  | -                 | 30                                 | 25                   | -                            | 2  | 2  | 9  |
| Punjab                 | 20            | 20             | -                    | 1                  | 1                 | -                                  | -                    | -                            | -  | -  | -  |
| Rajasthan              | 30            | 29             | -                    | -                  | -                 | -                                  | -                    | -                            | -  | -  | -  |
| Uttar Pradesh          | 40            | 34             | 3                    | 5                  | 11                | -                                  | -                    | -                            | -  | -  | -  |
| Total (States covered) | 140           | 129            | 4                    | 14                 | 22                | 130                                | 123                  | -                            | 6  | 6  | 66 |

| State                         | No. of expts. |           | No. of substitutions |          | No. of central fringe expts. | No. of expts. |           | No. of substitutions |          | No. of central fringe expts. |          |          |
|-------------------------------|---------------|-----------|----------------------|----------|------------------------------|---------------|-----------|----------------------|----------|------------------------------|----------|----------|
|                               | Planned       | Inspected | Village              | Expts.   |                              | Planned       | Inspected | Village              | Expts.   |                              |          |          |
|                               | 26            | 27        | 28                   | 29       | 30                           | 31            | 32        | 33                   | 34       | 35                           | 36       | 37       |
| Uttar Pradesh                 | -             | -         | -                    | -        | -                            | -             | -         | -                    | -        | -                            | -        | -        |
| Bihar                         | -             | -         | -                    | -        | -                            | -             | 20        | 12                   | -        | 3                            | 3        | -        |
| West Bengal                   | -             | -         | -                    | -        | -                            | -             | -         | -                    | -        | -                            | -        | -        |
| Madhya Pradesh                | -             | -         | -                    | -        | -                            | -             | -         | -                    | -        | -                            | -        | -        |
| Uttar Pradesh                 | -             | -         | -                    | -        | -                            | -             | -         | -                    | -        | -                            | -        | -        |
| Uttar Pradesh                 | 20            | 16        | -                    | -        | -                            | -             | -         | -                    | -        | -                            | -        | -        |
| Punjab                        | -             | -         | -                    | -        | -                            | -             | 20        | 19                   | -        | -                            | -        | -        |
| Rajasthan                     | 20            | 18        | -                    | -        | -                            | -             | 20        | 17                   | -        | -                            | -        | -        |
| Uttar Pradesh                 | 20            | 14        | 4                    | 5        | 13                           | -             | 30        | 17                   | 1        | 1                            | 3        | -        |
| <b>Total (States covered)</b> | <b>80</b>     | <b>67</b> | <b>4</b>             | <b>5</b> | <b>13</b>                    | <b>-</b>      | <b>90</b> | <b>65</b>            | <b>1</b> | <b>4</b>                     | <b>6</b> | <b>-</b> |

Table 2.1(a): Classificatory analysis of Gross yield rates (in lbs./acre) of dried grain by States and categories, Kharif 1952-53

| State          | J O W A R   |              |             |              |              |             |                |                  |              |             | B J R A      |              |             |             |                |                  |           |
|----------------|-------------|--------------|-------------|--------------|--------------|-------------|----------------|------------------|--------------|-------------|--------------|--------------|-------------|-------------|----------------|------------------|-----------|
|                | Category-2  |              |             | Category-4   |              |             | Category-5     |                  |              |             | Category-2   |              | Category-1  |             | Category-3     |                  |           |
|                | Man-ured    | Not man-ured | 3           | Pure         | Mixed        | 6           | Devel-lop-ment | Non-devel-opment | 7            | 8           | Man-ured     | Not man-ured | Pure        | Mixed       | Devel-lop-ment | Non-devel-opment | Com-bined |
| 1              | 2           | 3            | 4           | 5            | 6            | 7           | 8              | 9                | 10           | 11          | 12           | 13           | 14          | 15          | 16             | 17               | 18        |
| Uttar Pradesh  | 200<br>(12) | 203<br>(26)  | 240<br>(19) | 174<br>(20)  | 231<br>(32)  | 64<br>(6)   | 205<br>(38)    | 385<br>(1)       | 334<br>(16)  | 197<br>(6)  | 93<br>(11)   | 232<br>(10)  | 403<br>(7)  | 342<br>(17) |                |                  |           |
| Gujarat        | 403<br>(11) | 344<br>(21)  | 266<br>(20) | 611<br>(12)  | 402<br>(22)  | 380<br>(10) | 395<br>(32)    | 551<br>(11)      | 374<br>(25)  | 415<br>(15) | 451<br>(24)  | 426<br>(25)  | 457<br>(14) | 437<br>(39) |                |                  |           |
| Madhya Pradesh | 807<br>(4)  | 468<br>(35)  | 383<br>(9)  | 539<br>(30)  | 462<br>(24)  | 568<br>(15) | 503<br>(39)    | 406<br>(5)       | 180<br>(15)  | 63<br>(8)   | 353<br>(12)  | 200<br>(16)  | 385<br>(4)  | 237<br>(20) |                |                  |           |
| Madras         | 796<br>(6)  | 191<br>(8)   | 348<br>(7)  | 553<br>(7)   | 575<br>(10)  | 137<br>(4)  | 450<br>(14)    | 379<br>(5)       | 274<br>(9)   | 321<br>(5)  | 390<br>(9)   | 298<br>(9)   | 329<br>(5)  | 311<br>(14) |                |                  |           |
| Maharashtra    | 770<br>(7)  | 434<br>(53)  | 357<br>(7)  | 473<br>(53)  | 481<br>(52)  | 401<br>(8)  | 473<br>(60)    | 352<br>(4)       | 236<br>(42)  | 542<br>(9)  | 173<br>(37)  | 220<br>(36)  | 338<br>(10) | 246<br>(46) |                |                  |           |
| Mysore         | 289<br>(8)  | 423<br>(12)  | -           | 369<br>(20)  | 399<br>(16)  | 251<br>(4)  | 369<br>(20)    | -                | -            | -           | -            | -            | -           | -           |                |                  |           |
| Rajasthan      | -           | 398<br>(31)  | 345<br>(19) | 481<br>(12)  | 483<br>(25)  | 43<br>(6)   | 398<br>(31)    | 201<br>(7)       | 124<br>(51)  | 128<br>(42) | 179<br>(16)  | 171<br>(36)  | 96<br>(22)  | 142<br>(58) |                |                  |           |
| Uttar Pradesh  | 425<br>(8)  | 302<br>(34)  | 308<br>(15) | 335<br>(27)  | 300<br>(30)  | 390<br>(12) | 325<br>(42)    | 553<br>(9)       | 460<br>(26)  | 498<br>(5)  | 452<br>(30)  | 484<br>(27)  | 485<br>(7)  | 484<br>(35) |                |                  |           |
| Total          | 551<br>(56) | 363<br>(220) | 297<br>(95) | 143<br>(181) | 417<br>(211) | 603<br>(65) | 151<br>(476)   | 484<br>(15)      | 158<br>(184) | 340<br>(90) | 213<br>(139) | 256<br>(158) | 200<br>(71) | 157<br>(42) |                |                  |           |

Figures in brackets indicate the number of experiments.

Table 2.1(a): (Contd..)

| State          | M A I Z E    |                   |               |              |              |             |              |                      | Combined     |   |
|----------------|--------------|-------------------|---------------|--------------|--------------|-------------|--------------|----------------------|--------------|---|
|                | Category-1   |                   | Category-2    |              | Category-4   |             | Category-5   |                      |              |   |
|                | Irrigated    | Un-irri-<br>gated | Manured       | Not manured  | Pure         | Mixed       | Development  | Non-Deve-<br>lopment |              |   |
| 1              | 16           | 17                | 18            | 19           | 20           | 21          | 22           | 23                   | 24           |   |
| Andhra Pradesh | -            | -                 | -             | -            | -            | -           | -            | -                    | -            | - |
| Bihar          | -            | 949<br>(46)       | 1210<br>(17)  | 796<br>(29)  | 914<br>(42)  | 1311<br>(4) | 1041<br>(26) | 829<br>(20)          | 949<br>(46)  |   |
| Madras         | -            | -                 | -             | -            | -            | -           | -            | -                    | -            |   |
| Madhya Pradesh | -            | 770<br>(33)       | 1070<br>(21)  | 245<br>(12)  | 928<br>(26)  | 184<br>(7)  | 840<br>(20)  | 663<br>(13)          | 770<br>(33)  |   |
| Mysore         | -            | -                 | -             | -            | -            | -           | -            | -                    | -            |   |
| Punjab         | 908<br>(36)  | 474<br>(24)       | 892<br>(36)   | 499<br>(24)  | 733<br>(55)  | 754<br>(5)  | 665<br>(46)  | 963<br>(14)          | 731<br>(60)  |   |
| Rajasthan      | 1369<br>(1)  | 738<br>(37)       | 867<br>(15)   | 682<br>(23)  | 829<br>(28)  | 547<br>(10) | 718<br>(26)  | 835<br>(12)          | 755<br>(38)  |   |
| Uttar Pradesh  | 1365<br>(6)  | 811<br>(48)       | 1049<br>(36)  | 519<br>(18)  | 955<br>(34)  | 732<br>(20) | 914<br>(40)  | 752<br>(14)          | 872<br>(54)  |   |
| Pooled         | 1259<br>(43) | 773<br>(188)      | 1031<br>(125) | 574<br>(106) | 885<br>(185) | 761<br>(46) | 860<br>(153) | 905<br>(73)          | 831<br>(231) |   |

Figures in brackets indicate the number of experiments.

Table 2.1(a): (Concl'd.)

| State          | R A G I      |                   |              |             |              |             |              |                      | Subtotal     |
|----------------|--------------|-------------------|--------------|-------------|--------------|-------------|--------------|----------------------|--------------|
|                | Category-1   |                   | Category-2   |             | Category-4   |             | Category-5   |                      |              |
|                | Irrigated    | Un-irri-<br>gated | Manured      | Not manured | Pure         | Mixed       | Development  | Non-Deve-<br>lopment |              |
| 1              | 25           | 26                | 27           | 28          | 29           | 30          | 31           | 32                   | 33           |
| Andhra Pradesh | 568<br>(7)   | 577<br>(29)       | 639<br>(23)  | 476<br>(14) | 562<br>(29)  | 662<br>(1)  | 622<br>(26)  | 130<br>(10)          | 575<br>(36)  |
| Bihar          | -            | -                 | -            | -           | -            | -           | -            | -                    | -            |
| Madras         | 1419<br>(19) | 619<br>(11)       | 1234<br>(21) | 872<br>(9)  | 1431<br>(18) | 669<br>(12) | 1152<br>(15) | 1100<br>(15)         | 1126<br>(30) |
| Madhya Pradesh | -            | -                 | -            | -           | -            | -           | -            | -                    | -            |
| Mysore         | 1210<br>(2)  | 707<br>(46)       | 728<br>(48)  | -           | 770<br>(13)  | 712<br>(35) | 743<br>(34)  | 692<br>(14)          | 728<br>(48)  |
| Punjab         | -            | -                 | -            | -           | -            | -           | -            | -                    | -            |
| Rajasthan      | -            | -                 | -            | -           | -            | -           | -            | -                    | -            |
| Uttar Pradesh  | -            | -                 | -            | -           | -            | -           | -            | -                    | -            |
| Pooled         | 1133<br>(28) | 661<br>(86)       | 227<br>(91)  | 690<br>(23) | 882<br>(60)  | 686<br>(54) | 715<br>(16)  | 737<br>(39)          | 790<br>(114) |

Figures in brackets indicate the number of experiments.

Table 2.1(b): Classificatory analysis - Gross yield rates (in lbs./acre) of dried grain by States and categories, Rabi Season 1962-63

| State           | W H E A T    |              |             |              |               |              |              |              |              |                 | Combined     |
|-----------------|--------------|--------------|-------------|--------------|---------------|--------------|--------------|--------------|--------------|-----------------|--------------|
|                 | Category-1   |              | Category-2  |              | Category-3    |              | Category-4   |              | Category-5   |                 |              |
|                 | Irrigated    | Un-irrigated | Manured     | Not-manured  | Improved seed | Local seed   | Pure         | Impure       | Dev-lop-ment | Non-Dev-lopment |              |
| 1               | 2            | 3            | 4           | 5            | 6             | 7            | 8            | 9            | 10           | 11              | 12           |
| Bihar           | 661<br>(3)   | 391<br>(27)  | 511<br>(9)  | 384<br>(22)  | 1117<br>(1)   | 393<br>(20)  | 506<br>(16)  | 318<br>(11)  | 359<br>(12)  | 457<br>(12)     | 418<br>(30)  |
| Gujarat         | 734<br>(15)  | 391<br>(12)  | 745<br>(13) | 429<br>(14)  | 625<br>(3)    | 576<br>(24)  | 582<br>(27)  | -            | 620<br>(17)  | 516<br>(10)     | 582<br>(27)  |
| Jammu & Kashmir | 555<br>(2)   | 602<br>(11)  | 693<br>(7)  | 524<br>(12)  | 1024<br>(1)   | 562<br>(12)  | 642<br>(15)  | 354<br>(4)   | 586<br>(19)  | -               | 586<br>(19)  |
| Madhya Pradesh  | 782<br>(7)   | 461<br>(16)  | 433<br>(7)  | 611<br>(16)  | -             | 559<br>(23)  | 613<br>(13)  | 481<br>(10)  | 611<br>(19)  | 311<br>(4)      | 559<br>(23)  |
| Maharashtra     | 539<br>(10)  | 468<br>(10)  | 507<br>(6)  | 488<br>(23)  | -             | 492<br>(20)  | 497<br>(24)  | 466<br>(5)   | 506<br>(27)  | 308<br>(2)      | 492<br>(29)  |
| Mysore          | 1032<br>(2)  | 222<br>(10)  | 341<br>(7)  | 383<br>(5)   | -             | 358<br>(12)  | 1038<br>(2)  | 222<br>(10)  | 467<br>(6)   | 249<br>(6)      | 352<br>(12)  |
| Punjab          | 934<br>(21)  | 555<br>(20)  | 983<br>(12) | 517<br>(32)  | 833<br>(20)   | 480<br>(21)  | 859<br>(27)  | 480<br>(23)  | 627<br>(40)  | 638<br>(10)     | 684<br>(50)  |
| Rajasthan       | 874<br>(15)  | 385<br>(14)  | 2114<br>(1) | 585<br>(28)  | -             | 638<br>(20)  | 687<br>(21)  | 509<br>(8)   | 711<br>(23)  | 361<br>(6)      | 638<br>(29)  |
| Uttar Pradesh   | 805<br>(20)  | 393<br>(26)  | 796<br>(20) | 503<br>(35)  | 793<br>(22)   | 421<br>(27)  | 722<br>(20)  | 494<br>(27)  | 506<br>(35)  | 722<br>(20)     | 610<br>(55)  |
| Pooled          | 802<br>(110) | 431<br>(164) | 810<br>(87) | 528<br>(187) | 831<br>(62)   | 493<br>(212) | 697<br>(174) | 470<br>(101) | 579<br>(168) | 534<br>(76)     | 588<br>(274) |

Figures in brackets indicate the number of experiments.



Table 2.1 (b): (Contd..)

| State           | G R A M     |              |             |              |             |             |              |                  | Combined     |
|-----------------|-------------|--------------|-------------|--------------|-------------|-------------|--------------|------------------|--------------|
|                 | Category-1  |              | Category-2  |              | Category-4  |             | Category-5   |                  |              |
|                 | Irrigated   | Un-irrigated | Manured     | Not-manured  | Pure        | Mixed       | Develop-ment | Not Develop-ment |              |
| 1               | 13          | 14           | 15          | 16           | 17          | 18          | 19           | 20               | 21           |
| Bihar           | 304<br>(8)  | 289<br>(19)  | 298<br>(3)  | 293<br>(24)  | 405<br>(8)  | 247<br>(19) | 330<br>(21)  | 168<br>(6)       | 294<br>(27)  |
| Gujarat         | -           | -            | -           | -            | -           | -           | -            | -                | -            |
| Jammu & Kashmir | -           | -            | -           | -            | -           | -           | -            | -                | -            |
| Madhya Pradesh  | -           | 316<br>(15)  | 483<br>(3)  | 274<br>(12)  | 482<br>(7)  | 171<br>(8)  | 316<br>(15)  | -                | 316<br>(15)  |
| Maharashtra     | -           | -            | -           | -            | -           | -           | -            | -                | -            |
| Mysore          | -           | -            | -           | -            | -           | -           | -            | -                | -            |
| Punjab          | 403<br>(12) | 275<br>(18)  | 395<br>(5)  | 313<br>(25)  | 328<br>(19) | 326<br>(21) | 375<br>(22)  | 192<br>(8)       | 326<br>(30)  |
| Rajasthan       | 397<br>(5)  | 221<br>(25)  | -           | 250<br>(30)  | 247<br>(21) | 258<br>(9)  | 250<br>(30)  | -                | 250<br>(30)  |
| Uttar Pradesh   | 217<br>(6)  | 261<br>(18)  | 336<br>(2)  | 242<br>(22)  | 317<br>(4)  | 237<br>(20) | 264<br>(21)  | 153<br>(3)       | 250<br>(24)  |
| <b>Pooled</b>   | 326<br>(31) | 270<br>(25)  | 386<br>(13) | 272<br>(113) | 311<br>(49) | 254<br>(77) | 306<br>(109) | 171<br>(17)      | 286<br>(126) |

Figures in brackets indicate the number of experiments.

Table 2.1(b): (Contd..)

| State          | B A R L E Y  |              |              |             |              |             |              |                 |              |   |
|----------------|--------------|--------------|--------------|-------------|--------------|-------------|--------------|-----------------|--------------|---|
|                | Category-1   |              | Category-2   |             | Category-4   |             | Category-5   |                 | Combined     |   |
|                | Irrigated    | In-irrigated | Manured      | Not manured | Pure         | Mixed       | Development  | Non-development |              |   |
| 1              | 22           | 23           | 24           | 25          | 26           | 27          | 28           | 29              | 30           |   |
| Andhra Pradesh | -            | -            | -            | -           | -            | -           | -            | -               | -            | - |
| Bihar          | 435<br>(2)   | 354<br>(28)  | 399<br>(10)  | 339<br>(20) | 382<br>(15)  | 337<br>(15) | 356<br>(22)  | 368<br>(3)      | 359<br>(30)  |   |
| Madhya Pradesh | 106<br>(1)   | 430<br>(15)  | 797<br>(3)   | 320<br>(13) | 646<br>(6)   | 267<br>(10) | 444<br>(13)  | 258<br>(3)      | 407<br>(16)  |   |
| Maharashtra    | -            | -            | -            | -           | -            | -           | -            | -               | -            |   |
| Mysore         | -            | -            | -            | -           | -            | -           | -            | -               | -            |   |
| Punjab         | 861<br>(7)   | 356<br>(13)  | 622<br>(3)   | 516<br>(17) | 849<br>(8)   | 321<br>(12) | 563<br>(18)  | 261<br>(2)      | 532<br>(20)  |   |
| Rajasthan      | 1166<br>(15) | 535<br>(14)  | 1420<br>(9)  | 610<br>(20) | 1207<br>(13) | 580<br>(16) | 859<br>(35)  | 878<br>(4)      | 362<br>(29)  |   |
| Uttar Pradesh  | 884<br>(20)  | 474<br>(14)  | 1060<br>(11) | 550<br>(23) | 776<br>(21)  | 617<br>(13) | 765<br>(26)  | 555<br>(8)      | 715<br>(34)  |   |
| Pooled         | 825<br>(45)  | 460<br>(34)  | 997<br>(36)  | 517<br>(23) | 796<br>(63)  | 536<br>(66) | 698<br>(104) | 551<br>(25)     | 665<br>(129) |   |

Figures in brackets indicate the number of experiments.

Table 2.1(b): (Concl.)

| State          | R A B I J O W A R |             |             |             |             |                      | Combined     |
|----------------|-------------------|-------------|-------------|-------------|-------------|----------------------|--------------|
|                | Category-2        |             | Category-4  |             | Category-5  |                      |              |
|                | Manured           | Not manured | Pure        | Mixed       | Development | Non-develop-<br>ment |              |
| 1              | 31                | 32          | 33          | 34          | 35          | 36                   | 37           |
| Andhra Pradesh | 407<br>(14)       | 223<br>(34) | 230<br>(35) | 281<br>(13) | 305<br>(36) | 206<br>(12)          | 281<br>(48)  |
| Bihar          | -                 | -           | -           | -           | -           | -                    | -            |
| Madhya Pradesh | -                 | -           | -           | -           | -           | -                    | -            |
| Maharashtra    | 453<br>(5)        | 391<br>(45) | 510<br>(23) | 301<br>(27) | 352<br>(44) | 723<br>(6)           | 397<br>(50)  |
| Mysore         | 507<br>(6)        | 173<br>(19) | 321<br>(9)  | 215<br>(16) | 280<br>(19) | 169<br>(6)           | 253<br>(25)  |
| Punjab         | -                 | -           | -           | -           | -           | -                    | -            |
| Rajasthan      | -                 | -           | -           | -           | -           | -                    | -            |
| Uttar Pradesh  | -                 | -           | -           | -           | -           | -                    | -            |
| Pooled         | 460<br>(25)       | 307<br>(98) | 423<br>(67) | 275<br>(56) | 325<br>(99) | 496<br>(24)          | 340<br>(129) |

Figures in brackets indicate the number of experiments.

**Table 2.1: Classificatory analysis - Gross yield rates**  
Khharif and Rabi Non-food crops, 1962-63

| Stat.         | *S U G A R - C A N N E |              |              |              |               |              |              |                  | Combined      |
|---------------|------------------------|--------------|--------------|--------------|---------------|--------------|--------------|------------------|---------------|
|               | Category-1             |              | Category-2   |              | Category-3    |              | Category-5   |                  |               |
|               | Irrigated              | Un-irrigated | Manured      | Not-manured  | Improved seed | Local seed   | Develop-ment | Non-develop-ment |               |
| 1             | 2                      | 3            | 4            | 5            | 6             | 7            | 8            | 9                | 10            |
| Uttar Pradesh | 31.3<br>(17)           | -            | 31.3<br>(17) | -            | 33.8<br>(12)  | 25.3<br>(5)  | 33.7<br>(15) | 13.8<br>(2)      | 31.3<br>(17)  |
| Assam         | -                      | -            | -            | -            | -             | -            | -            | -                | -             |
| Bihar         | 12.3<br>(7)            | 10.7<br>(21) | 10.8<br>(14) | 11.4<br>(14) | 27.9<br>(2)   | 9.8<br>(26)  | 9.8<br>(20)  | 11.4<br>(8)      | 11.1<br>(28)  |
| Madras        | 21.4<br>(14)           | -            | 23.1<br>(13) | 0.0<br>(1)   | 21.4<br>(14)  | -            | 21.3<br>(12) | 22.0<br>(2)      | 21.4<br>(14)  |
| Mysore        | 25.1<br>(14)           | -            | 26.4<br>(13) | 8.1<br>(1)   | 31.6<br>(9)   | 13.4<br>(5)  | 27.2<br>(7)  | 23.0<br>(7)      | 25.1<br>(14)  |
| Orissa        | -                      | -            | -            | -            | -             | -            | -            | -                | -             |
| Punjab        | 12.2<br>(26)           | 1.6<br>(4)   | 10.9<br>(16) | 10.6<br>(14) | 13.3<br>(20)  | 5.8<br>(10)  | 12.0<br>(18) | 8.9<br>(12)      | 10.8<br>(30)  |
| Uttar Pradesh | 12.3<br>(22)           | 11.3<br>(13) | 12.1<br>(25) | 11.3<br>(10) | 11.7<br>(26)  | 12.5<br>(9)  | 11.9<br>(24) | 12.0<br>(11)     | 11.9<br>(35)  |
| Pooled        | 13.8<br>(100)          | 9.8<br>(38)  | 13.5<br>(98) | 10.7<br>(40) | 15.4<br>(33)  | 11.9<br>(55) | 13.5<br>(96) | 12.6<br>(42)     | 13.3<br>(138) |

Figures in brackets indicate the number of experiments

\* Yield rates in terms of tons/acre.

Figures in brackets indicate the number of experiments

\* Yield rates in terms of tons/acre.

Table 2.1: (Contd..)

| State          | *J U T E     |             |               |             |             |                 | Combined    |
|----------------|--------------|-------------|---------------|-------------|-------------|-----------------|-------------|
|                | Category -2  |             | Category -3   |             | Category -5 |                 |             |
|                | Manured      | Not manured | Improved seed | Local seed  | Development | Non-development |             |
| 1              | 11           | 12          | 13            | 14          | 15          | 16              | 17          |
| Andhra Pradesh | -            | -           | -             | -           | -           | -               | -           |
| Assam          | 661<br>(9)   | 594<br>(9)  | -             | 627<br>(18) | 621<br>(12) | 640<br>(6)      | 627<br>(18) |
| Bihar          | 831<br>(9)   | 962<br>(33) | -             | 934<br>(42) | 871<br>(24) | 1018<br>(18)    | 934<br>(42) |
| Madras         | -            | -           | -             | -           | -           | -               | -           |
| Mysore         | -            | -           | -             | -           | -           | -               | -           |
| Orissa         | 1130<br>(16) | 787<br>(18) | 936<br>(21)   | 969<br>(13) | 972<br>(28) | 838<br>(6)      | 948<br>(34) |
| Punjab         | -            | -           | -             | -           | -           | -               | -           |
| Uttar Pradesh  | -            | -           | -             | -           | -           | -               | -           |
| Poolal         | 855<br>(34)  | 810<br>(60) | 936<br>(21)   | 852<br>(73) | 822<br>(64) | 862<br>(30)     | 847<br>(94) |

Figures in brackets indicate the number of experiments.

\* Yield rates (in lbs./acre) of dried fibre.

Table 2.1: (Concl'd.)

| State          | *L I N S E E D |             |                       |                      |               | *R A P E & M U S T A R D |                     |             |            |                       |                          |               |
|----------------|----------------|-------------|-----------------------|----------------------|---------------|--------------------------|---------------------|-------------|------------|-----------------------|--------------------------|---------------|
|                | Category-1     |             | Category-5            |                      | Com-<br>bined | Category-2               |                     | Category-4  |            | Category-5            |                          | Com-<br>bined |
|                | Pur.           | Mixed       | Deve-<br>lop-<br>ment | Non-dev-<br>elopment |               | Man-<br>ured             | Not<br>man-<br>ured | Pure        | Mixed      | Deve-<br>lop-<br>ment | Non-<br>develop-<br>ment |               |
| 1              | 18             | 19          | 20                    | 21                   | 22            | 23                       | 24                  | 25          | 26         | 27                    | 28                       | 29            |
|                | -              | -           | -                     | -                    | -             | -                        | 157<br>(12)         | 157<br>(12) | -          | 158<br>(10)           | 28<br>(2)                | 157<br>(12)   |
| Andhra Pradesh | 221<br>(12)    | 102<br>(7)  | 217<br>(13)           | 25<br>(6)            | 177<br>(10)   | -                        | -                   | -           | -          | -                     | -                        | -             |
| Mysore         | 363<br>(6)     | 135<br>(10) | 215<br>(14)           | 274<br>(2)           | 222<br>(16)   | -                        | -                   | -           | -          | -                     | -                        | -             |
| Punjab         | -              | -           | -                     | -                    | -             | 296<br>(3)               | 290<br>(16)         | 339<br>(12) | 208<br>(7) | 196<br>(10)           | 396<br>(9)               | 291<br>(19)   |
| Rajasthan      | 170<br>(13)    | 170<br>(5)  | 189<br>(10)           | 145<br>(8)           | 170<br>(13)   | 378<br>(7)               | 204<br>(10)         | 326<br>(14) | 18<br>(3)  | 284<br>(15)           | 216<br>(2)               | 276<br>(17)   |
| Utt. Pradesh   | 140<br>(9)     | 139<br>(5)  | 159<br>(10)           | 92<br>(4)            | 140<br>(14)   | 467<br>(5)               | 436<br>(12)         | 469<br>(16) | 63<br>(1)  | 458<br>(15)           | 346<br>(2)               | 445<br>(17)   |
| Pooled         | 190<br>(40)    | 123<br>(27) | 206<br>(47)           | 70<br>(20)           | 163<br>(67)   | 438<br>(15)              | 385<br>(50)         | 427<br>(54) | 75<br>(11) | 400<br>(50)           | 325<br>(15)              | 399<br>(65)   |

Figures in brackets indicate the number of experiments.

\* Yield rates (in lbs./acre) of dried grain.

Table 2.2(a): Classificatory analysis - Net yield rates (in lbs./acr.) of dried grain by States and categories, Kharif Food Crops, 1962-63

| State          | J O W A R    |                     |             |              |                       |                          |               | B A T H A    |                      |             |              |                       |                          |               |
|----------------|--------------|---------------------|-------------|--------------|-----------------------|--------------------------|---------------|--------------|----------------------|-------------|--------------|-----------------------|--------------------------|---------------|
|                | Category-2   |                     | Category-4  |              | Category-5            |                          | Com-<br>bined | Category-2   |                      | Category-4  |              | Category-5            |                          | Com-<br>bined |
|                | Man-<br>ured | Not<br>man-<br>ured | Pure        | Mixed        | Deve-<br>lop-<br>ment | Non-<br>devel-<br>opment |               | Man-<br>ured | Not-<br>man-<br>ured | Pure        | Mixed        | Deve-<br>lop-<br>ment | Non-<br>devel-<br>opment |               |
| 1              | 2            | 3                   | 4           | 5            | 6                     | 7                        | 8             | 9            | 10                   | 11          | 12           | 13                    | 14                       | 15            |
| Andhra Pradesh | 307<br>(12)  | 242<br>(26)         | 240<br>(18) | 283<br>(20)  | 296<br>(32)           | 86<br>(6)                | 262<br>(32)   | 452<br>(1)   | 382<br>(16)          | 797<br>(6)  | 162<br>(11)  | 243<br>(10)           | 589<br>(7)               | 386<br>(17)   |
| Gujarat        | 546<br>(11)  | 368<br>(21)         | 266<br>(20) | 701<br>(12)  | 435<br>(22)           | 415<br>(10)              | 429<br>(32)   | 569<br>(14)  | 454<br>(25)          | 415<br>(15) | 546<br>(24)  | 452<br>(25)           | 563<br>(14)              | 495<br>(39)   |
| Madhya Pradesh | 987<br>(4)   | 551<br>(35)         | 383<br>(9)  | 660<br>(30)  | 572<br>(24)           | 625<br>(15)              | 506<br>(39)   | 522<br>(5)   | 277<br>(15)          | 63<br>(8)   | 549<br>(12)  | 314<br>(16)           | 515<br>(4)               | 354<br>(20)   |
| Madras         | 1246<br>(6)  | 444<br>(8)          | 348<br>(7)  | 1227<br>(7)  | 1042<br>(10)          | 152<br>(4)               | 722<br>(14)   | 419<br>(5)   | 282<br>(9)           | 331<br>(5)  | 331<br>(9)   | 313<br>(8)            | 355<br>(6)               | 331<br>(14)   |
| Maharashtra    | 934<br>(7)   | 562<br>(53)         | 357<br>(7)  | 638<br>(53)  | 626<br>(52)           | 472<br>(8)               | 605<br>(60)   | 400<br>(4)   | 253<br>(42)          | 542<br>(9)  | 199<br>(37)  | 238<br>(36)           | 369<br>(10)              | 266<br>(46)   |
| Mysore         | 339<br>(8)   | 539<br>(12)         | -           | 459<br>(20)  | 492<br>(16)           | 305<br>(4)               | 459<br>(20)   | -            | -                    | -           | -            | -                     | -                        | -             |
| Rajasthan      | -            | 410<br>(31)         | 345<br>(19) | 512<br>(12)  | 492<br>(25)           | 43<br>(6)                | 410<br>(31)   | 201<br>(7)   | 180<br>(51)          | 122<br>(42) | 326<br>(16)  | 221<br>(36)           | 121<br>(22)              | 183<br>(58)   |
| Uttar Pradesh  | 564<br>(2)   | 413<br>(34)         | 302<br>(15) | 516<br>(27)  | 412<br>(30)           | 500<br>(12)              | 441<br>(42)   | 725<br>(9)   | 679<br>(26)          | 492<br>(5)  | 741<br>(30)  | 702<br>(27)           | 702<br>(8)               | 706<br>(35)   |
| Pooled         | 719<br>(56)  | 457<br>(220)        | 327<br>(95) | 596<br>(181) | 535<br>(211)          | 357<br>(65)              | 500<br>(276)  | 379<br>(45)  | 300<br>(121)         | 330<br>(90) | 362<br>(130) | 313<br>(150)          | 331<br>(71)              | 316<br>(229)  |

Figures in brackets indicate the number of experiments.

Table 2.2(a): Contd.

| State          | M A I Z P    |               |               |              |              |              |              |                 |              |
|----------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|-----------------|--------------|
|                | Category-1   |               | Category-2    |              | Category-3   |              | Category-5   |                 | Combined     |
|                | Irrigated    | Non-Irrigated | Manured       | Not-manured  | Pure         | Mixed        | Development  | Non-Development |              |
| 5              | 7            | 18            | 19            | 20           | 21           | 22           | 23           | 24              |              |
| Uttar Pradesh  | -            | -             | -             | -            | -            | -            | -            | -               | -            |
| Bihar          | -            | 978<br>(46)   | 1220<br>(17)  | 936<br>(27)  | 914<br>(42)  | 1645<br>(4)  | 1092<br>(26) | 829<br>(20)     | 978<br>(46)  |
| Madras         | -            | -             | -             | -            | -            | -            | -            | -               | -            |
| Madhya Pradesh | -            | 870<br>(33)   | 1129<br>(21)  | 418<br>(12)  | 928<br>(26)  | 656<br>(7)   | 935<br>(20)  | 771<br>(13)     | 870<br>(33)  |
| Mysor          | -            | -             | -             | -            | -            | -            | -            | -               | -            |
| Punjab         | 938<br>(36)  | 516<br>(24)   | 933<br>(36)   | 523<br>(24)  | 733<br>(55)  | 1166<br>(5)  | 685<br>(4)   | 1044<br>(11)    | 769<br>(60)  |
| West Bengal    | 1436<br>(1)  | 782<br>(37)   | 927<br>(15)   | 716<br>(33)  | 829<br>(29)  | 714<br>(10)  | 77<br>(2)    | 853<br>(12)     | 799<br>(33)  |
| Uttar Pradesh  | 1528<br>(6)  | 923<br>(42)   | 1146<br>(36)  | 674<br>(19)  | 955<br>(34)  | 1051<br>(20) | 106<br>(4)   | 742<br>(11)     | 900<br>(54)  |
| Total          | 1363<br>(43) | 841<br>(122)  | 1088<br>(125) | 664<br>(106) | 885<br>(185) | 1089<br>(16) | 941<br>(15)  | 847<br>(73)     | 903<br>(231) |

Figures in brackets indicate the number of experiments.



Table 2.2(a): (Concl'd.)

| State          | R A G I      |              |              |             |              |             |              |                 | Combined     |
|----------------|--------------|--------------|--------------|-------------|--------------|-------------|--------------|-----------------|--------------|
|                | Category-1   |              | Category-2   |             | Category-4   |             | Category-5   |                 |              |
|                | Irrigated    | Un-irrigated | Manured      | Not-manured | Pure         | Mixed       | Development  | Non-Development |              |
| 1              | 25           | 26           | 27           | 28          | 29           | 30          | 31           | 32              | 33           |
| Andhra Pradesh | 614<br>(7)   | 605<br>(29)  | 686<br>(22)  | 483<br>(14) | 562<br>(29)  | 793<br>(7)  | 671<br>(26)  | 439<br>(10)     | 607<br>(36)  |
| Bihar          | -            | -            | -            | -           | -            | -           | -            | -               | -            |
| Madras         | 1420<br>(19) | 678<br>(11)  | 1251<br>(21) | 907<br>(9)  | 1431<br>(18) | 723<br>(12) | 1175<br>(15) | 1120<br>(15)    | 1148<br>(30) |
| Madhya Pradesh | -            | -            | -            | -           | -            | -           | -            | -               | -            |
| Mysore         | 1210<br>(2)  | 814<br>(46)  | 830<br>(48)  | -           | 770<br>(13)  | 853<br>(35) | 857<br>(34)  | 766<br>(14)     | 830<br>(48)  |
| Punjab         | -            | -            | -            | -           | -            | -           | -            | -               | -            |
| Rajasthan      | -            | -            | -            | -           | -            | -           | -            | -               | -            |
| Uttar Pradesh  | -            | -            | -            | -           | -            | -           | -            | -               | -            |
| Pooled         | 1142<br>(29) | 742<br>(86)  | 899<br>(91)  | 712<br>(23) | 882<br>(60)  | 811<br>(54) | 894<br>(75)  | 784<br>(39)     | 867<br>(114) |

Figures in brackets indicate the number of experiments.

Table 2.2(b): Classificatory analysis - Net Yield rates (in lbs./acre) of dried grain by States and categories, Rabi food crops, 1962-63

| State           | W H E A T    |               |              |              |                |              |              |              |               |                  |              |
|-----------------|--------------|---------------|--------------|--------------|----------------|--------------|--------------|--------------|---------------|------------------|--------------|
|                 | Category-1   |               | Category-2   |              | Category-3     |              | Category-4   |              | Category-5    |                  | Combine      |
|                 | Irri-gated   | Un-irri-gated | Manured      | Not-manured  | Imp-roved seed | Local seed   | Pure         | Mixed        | De-velop-ment | Non-develop-ment |              |
| 1               | 2            | 3             | 4            | 5            | 6              | 7            | 8            | 9            | 10            | 11               | 12           |
| Bihar           | 674<br>(3)   | 566<br>(27)   | 611<br>(2)   | 565<br>(22)  | 1117<br>(1)    | 558<br>(20)  | 508<br>(16)  | 658<br>(14)  | 454<br>(12)   | 550<br>(18)      | 577<br>(30)  |
| Gujerat         | 734<br>(15)  | 391<br>(12)   | 745<br>(13)  | 429<br>(14)  | 625<br>(3)     | 576<br>(24)  | 522<br>(27)  | -            | 620<br>(17)   | 516<br>(10)      | 582<br>(27)  |
| Jammu & Kashmir | 550<br>(8)   | 618<br>(11)   | 607<br>(7)   | 532<br>(12)  | 1024<br>(1)    | 569<br>(18)  | 640<br>(15)  | 387<br>(4)   | 593<br>(19)   | -                | 593<br>(19)  |
| Madhya Pradesh  | 700<br>(7)   | 552<br>(16)   | 480<br>(7)   | 688<br>(16)  | -              | 624<br>(23)  | 618<br>(13)  | 632<br>(10)  | 689<br>(19)   | 317<br>(4)       | 624<br>(23)  |
| Maharashtra     | 542<br>(10)  | 468<br>(10)   | 513<br>(6)   | 488<br>(23)  | -              | 493<br>(20)  | 497<br>(24)  | 476<br>(5)   | 507<br>(27)   | 308<br>(2)       | 493<br>(20)  |
| Mysore          | 1030<br>(2)  | 256<br>(10)   | 377<br>(7)   | 398<br>(5)   | -              | 386<br>(12)  | 1038<br>(2)  | 256<br>(10)  | 479<br>(6)    | 293<br>(6)       | 386<br>(12)  |
| Punjab          | 1000<br>(21) | 649<br>(29)   | 1034<br>(18) | 663<br>(32)  | 926<br>(20)    | 617<br>(21)  | 859<br>(27)  | 724<br>(23)  | 805<br>(40)   | 764<br>(10)      | 737<br>(50)  |
| Rajasthan       | 1135<br>(15) | 422<br>(14)   | 2114<br>(1)  | 744<br>(28)  | -              | 701<br>(29)  | 687<br>(21)  | 1064<br>(8)  | 809<br>(23)   | 380<br>(6)       | 701<br>(20)  |
| Uttar Pradesh   | 876<br>(29)  | 529<br>(26)   | 884<br>(20)  | 613<br>(35)  | 880<br>(28)    | 538<br>(27)  | 722<br>(29)  | 701<br>(27)  | 626<br>(35)   | 863<br>(20)      | 711<br>(55)  |
| Pooled          | 863<br>(110) | 533<br>(164)  | 872<br>(87)  | 630<br>(187) | 906<br>(62)    | 592<br>(212) | 692<br>(173) | 691<br>(101) | 676<br>(198)  | 513<br>(22)      | 678<br>(274) |

Figures in brackets indicate the number of experiments.

Table 2.2(b): (Contd.)

| State           | G R A M     |              |             |              |             |              |              |                 | Combined     |
|-----------------|-------------|--------------|-------------|--------------|-------------|--------------|--------------|-----------------|--------------|
|                 | Category-1  |              | Category-2  |              | Category-4  |              | Category-5   |                 |              |
|                 | Irrigated   | Un-irrigated | Manured     | Not-manured  | Pure        | Mixed        | Development  | Non-development |              |
| 1               | 13          | 14           | 15          | 16           | 17          | 18           | 19           | 20              | 21           |
| Bihar           | 482<br>(8)  | 472<br>(19)  | 490<br>(3)  | 473<br>(24)  | 405<br>(8)  | 504<br>(19)  | 507<br>(21)  | 362<br>(6)      | 475<br>(27)  |
| Gujarat         | -           | -            | -           | -            | -           | -            | -            | -               | -            |
| Jammu & Kashmir | -           | -            | -           | -            | -           | -            | -            | -               | -            |
| Madhya Pradesh  | -           | 424<br>(15)  | 540<br>(3)  | 395<br>(12)  | 482<br>(7)  | 373<br>(8)   | 424<br>(15)  | -               | 424<br>(15)  |
| Maharashtra     | -           | -            | -           | -            | -           | -            | -            | -               | -            |
| Mysore          | -           | -            | -           | -            | -           | -            | -            | -               | -            |
| Panjab          | 679<br>(12) | 493<br>(18)  | 601<br>(5)  | 561<br>(25)  | 328<br>(9)  | 671<br>(21)  | 654<br>(22)  | 332<br>(8)      | 568<br>(30)  |
| Rajasthan       | 399<br>(5)  | 252<br>(25)  | -           | 277<br>(30)  | 247<br>(21) | 347<br>(9)   | 277<br>(30)  | -               | 277<br>(30)  |
| Uttar Pradesh   | 482<br>(6)  | 360<br>(18)  | 426<br>(2)  | 387<br>(22)  | 317<br>(4)  | 405<br>(20)  | 388<br>(21)  | 405<br>(3)      | 390<br>(24)  |
| Pooled          | 530<br>(31) | 396<br>(25)  | 515<br>(13) | 422<br>(113) | 344<br>(49) | 468<br>(177) | 455<br>(109) | 369<br>(17)     | 430<br>(126) |

Figures in brackets indicate the number of experiments.

Table 2(b): Contd.

| State          | B A R L E Y  |              |              |              |              |              |              |                 | Combined     |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|--------------|
|                | Category-1   |              | Category-2   |              | Category-4   |              | Category-5   |                 |              |
|                | Irrigated    | Un-irrigated | Manured      | Not-manured  | Pure         | Mixed        | Development  | Non-development |              |
| 1              | 22           | 23           | 24           | 25           | 26           | 27           | 28           | 29              | 30           |
| Andhra Pradesh | -            | -            | -            | -            | -            | -            | -            | -               | -            |
| Bihar          | 1077<br>(2)  | 447<br>(28)  | 659<br>(10)  | 403<br>(20)  | 382<br>(15)  | 596<br>(15)  | 508<br>(22)  | 436<br>(8)      | 489<br>(30)  |
| Madhya Pradesh | 309<br>(1)   | 552<br>(15)  | 864<br>(3)   | 462<br>(13)  | 646<br>(6)   | 471<br>(10)  | 511<br>(13)  | 652<br>(3)      | 537<br>(16)  |
| Maharashtra    | -            | -            | -            | -            | -            | -            | -            | -               | -            |
| Mysore         | -            | -            | -            | -            | -            | -            | -            | -               | -            |
| Punjab         | 881<br>(7)   | 490<br>(13)  | 671<br>(3)   | 620<br>(17)  | 849<br>(8)   | 479<br>(12)  | 666<br>(18)  | 279<br>(2)      | 628<br>(20)  |
| Rajasthan      | 1674<br>(15) | 723<br>(14)  | 1551<br>(9)  | 1063<br>(20) | 1207<br>(13) | 1221<br>(16) | 1255<br>(25) | 967<br>(4)      | 1214<br>(29) |
| Uttar Pradesh  | 938<br>(20)  | 669<br>(14)  | 1107<br>(21) | 693<br>(23)  | 776<br>(21)  | 911<br>(13)  | 888<br>(26)  | 633<br>(8)      | 828<br>(34)  |
| Pooled         | 1039<br>(45) | 633<br>(84)  | 1086<br>(36) | 701<br>(93)  | 796<br>(63)  | 872<br>(66)  | 866<br>(104) | 647<br>(25)     | 822<br>(129) |

Figures in brackets indicate the number of experiments.

Table 2.2(b): Concl'd.

| State          | R A B I J O W A R |             |             |             |             |                 | Combined     |
|----------------|-------------------|-------------|-------------|-------------|-------------|-----------------|--------------|
|                | Category-2        |             | Category-4  |             | Category-5  |                 |              |
|                | Manured           | Not manured | Pure        | Mixed       | Development | Non-development |              |
| 1              | 31                | 32          | 33          | 34          | 35          | 36              | 37           |
| Andhra Pradesh | 430<br>(14)       | 245<br>(34) | 280<br>(35) | 350<br>(13) | 242<br>(36) | 222<br>(12)     | 299<br>(48)  |
| Bihar          | -                 | -           | -           | -           | -           | -               | -            |
| Madhya Pradesh | -                 | -           | -           | -           | -           | -               | -            |
| Maharashtra    | 485<br>(5)        | 410<br>(45) | 510<br>(23) | 339<br>(27) | 375<br>(44) | 735<br>(6)      | 418<br>(50)  |
| Mysore         | 517<br>(6)        | 187<br>(19) | 321<br>(9)  | 235<br>(16) | 297<br>(19) | 170<br>(6)      | 266<br>(25)  |
| Punjab         | -                 | -           | -           | -           | -           | -               | -            |
| Rajasthan      | -                 | -           | -           | -           | -           | -               | -            |
| Uttar Pradesh  | -                 | -           | -           | -           | -           | -               | -            |
| Pooled         | 434<br>(25)       | 324<br>(98) | 423<br>(67) | 318<br>(56) | 338<br>(99) | 508<br>(24)     | 358<br>(123) |

Figures in brackets indicate the number of experiments

2.2: Classificatory analysis - net yield rates (harvestable) 1950-1951 crop

| State          | *SUGAR - CANE |              |              |              |               |              |              |                 | Combined      |
|----------------|---------------|--------------|--------------|--------------|---------------|--------------|--------------|-----------------|---------------|
|                | Category-1    |              | Category-2   |              | Category-3    |              | Category-5   |                 |               |
|                | Irrigated     | Un-irrigated | Manured      | Not-manured  | Improved seed | Local seed   | Development  | Not development |               |
| 1              | 2             | 3            | 4            | 5            | 6             | 7            | 8            | 9               | 10            |
| Andhra Pradesh | 31.3<br>(17)  | -            | 31.3<br>(17) | -            | 33.8<br>(12)  | 25.3<br>(5)  | 33.7<br>(15) | 13.8<br>(2)     | 31.3<br>(17)  |
| Assam          | -             | -            | -            | -            | -             | -            | -            | -               | -             |
| Bihar          | 12.3<br>(7)   | 10.7<br>(21) | 10.8<br>(14) | 11.4<br>(14) | 27.9<br>(2)   | 9.8<br>(26)  | 9.8<br>(20)  | 14.4<br>(8)     | 11.1<br>(28)  |
| Madras         | 21.4<br>(14)  | -            | 23.1<br>(13) | 0.0<br>(1)   | 21.4<br>(14)  | -            | 21.3<br>(12) | 22.0<br>(2)     | 21.4<br>(14)  |
| Mysore         | 25.1<br>(14)  | -            | 26.4<br>(13) | 8.1<br>(1)   | 31.6<br>(9)   | 13.4<br>(5)  | 27.2<br>(7)  | 23.0<br>(7)     | 25.1<br>(14)  |
| Orissa         | -             | -            | -            | -            | -             | -            | -            | -               | -             |
| Punjab         | 12.2<br>(26)  | 1.6<br>(4)   | 10.9<br>(16) | 10.6<br>(14) | 13.3<br>(20)  | 5.8<br>(10)  | 12.0<br>(18) | 8.9<br>(12)     | 10.8<br>(30)  |
| Uttar Pradesh  | 12.3<br>(22)  | 11.3<br>(13) | 12.1<br>(25) | 11.3<br>(10) | 11.7<br>(26)  | 12.5<br>(9)  | 11.9<br>(24) | 12.0<br>(11)    | 11.9<br>(35)  |
| Pooled         | 13.8<br>(100) | 9.8<br>(38)  | 13.5<br>(98) | 10.7<br>(40) | 15.4<br>(83)  | 11.9<br>(55) | 13.5<br>(96) | 12.6<br>(42)    | 13.3<br>(138) |

Figures in brackets indicate the number of experiments.

\* yield rates in terms of tons/acre.

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Table 2.2: (Contd.)

| State          | * J U T E           |                     |                     |                     |                     |                     |                     |   |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---|
|                | Category-2          |                     | Category-3          |                     | Category-5          |                     | Combined            |   |
|                | Manured             | Not manured         | Improved seed       | Local seed          | Development         | Non development     |                     |   |
| 1              | 11                  | 12                  | 13                  | 14                  | 15                  | 16                  | 17                  |   |
| Andhra Pradesh | -                   | -                   | -                   | -                   | -                   | -                   | -                   | - |
| Assam          | 661<br>(9)          | 594<br>(9)          | -                   | 627<br>(18)         | 621<br>(12)         | 640<br>(6)          | 627<br>(18)         |   |
| Bihar          | 831<br>(9)          | 964<br>(33)         | -                   | 936<br>(42)         | 874<br>(24)         | 1018<br>(18)        | 936<br>(42)         |   |
| Madras         | -                   | -                   | -                   | -                   | -                   | -                   | -                   |   |
| Mysore         | -                   | -                   | -                   | -                   | -                   | -                   | -                   |   |
| Orissa         | 1130<br>(16)        | 787<br>(18)         | 936<br>(21)         | 969<br>(13)         | 972<br>(28)         | 838<br>(6)          | 948<br>(34)         |   |
| Punjab         | -                   | -                   | -                   | -                   | -                   | -                   | -                   |   |
| Uttar Pradesh  | -                   | -                   | -                   | -                   | -                   | -                   | -                   |   |
| <b>Pooled</b>  | <b>855<br/>(34)</b> | <b>811<br/>(60)</b> | <b>936<br/>(21)</b> | <b>853<br/>(73)</b> | <b>824<br/>(64)</b> | <b>862<br/>(30)</b> | <b>848<br/>(94)</b> |   |

Figures in brackets indicate the number of experiments.  
\*Yield rates (in lbs./acre) of dried fibre.

Table 2.2: Concl'd.

| State          | *L N S E E D |             |                       |                          |               | P H A P & M U S I |                      |             |             |                       |                       |               |             |
|----------------|--------------|-------------|-----------------------|--------------------------|---------------|-------------------|----------------------|-------------|-------------|-----------------------|-----------------------|---------------|-------------|
|                | Category-4   |             | Category-5            |                          | Com-<br>bined | Category-2        |                      | Category-4  |             | Category-5            |                       | Non-<br>bined |             |
|                | Pure         | Mixed       | Deve-<br>lop-<br>ment | Non-<br>develop-<br>ment |               | Manured           | Not-<br>man-<br>ured | Pure        | Mixed       | Deve-<br>lop-<br>ment | Deve-<br>lop-<br>ment |               |             |
| 1              | 18           | 19          | 20                    | 21                       | 22            | 23                | 24                   | 25          | 26          | 27                    | 28                    | 29            |             |
| Assam          | -            | -           | -                     | -                        | -             | -                 | 157<br>(12)          | 157<br>(12) | -           | -                     | 153<br>(10)           | 28<br>(2)     | 157<br>(12) |
| Madhya Pradesh | 221<br>(12)  | 266<br>(7)  | 334<br>(13)           | 28<br>(6)                | 238<br>(19)   | -                 | -                    | -           | -           | -                     | -                     | -             | -           |
| Mysore         | 368<br>(6)   | 420<br>(10) | 418<br>(14)           | 280<br>(2)               | 400<br>(16)   | -                 | -                    | -           | -           | -                     | -                     | -             | -           |
| Punjab         | -            | -           | -                     | -                        | -             | 296<br>(3)        | 617<br>(16)          | 339<br>(12) | 957<br>(7)  | 557<br>(10)           | 576<br>(9)            | 567<br>(13)   |             |
| Rajasthan      | 170<br>(13)  | 315<br>(5)  | 236<br>(10)           | 179<br>(8)               | 211<br>(18)   | 378<br>(7)        | 232<br>(10)          | 326<br>(14) | 136<br>(3)  | 302<br>(15)           | 216<br>(2)            | 292<br>(17)   |             |
| Uttar Pradesh  | 140<br>(9)   | 178<br>(5)  | 178<br>(10)           | 92<br>(4)                | 154<br>(14)   | 475<br>(5)        | 436<br>(12)          | 469<br>(15) | 105<br>(1)  | 462<br>(15)           | 346<br>(2)            | 448<br>(17)   |             |
| Total          | 100<br>(40)  | 210<br>(27) | 257<br>(47)           | 74<br>(20)               | 208<br>(67)   | 414<br>(15)       | 424<br>(50)          | 427<br>(54) | 207<br>(11) | 444<br>(50)           | 345<br>(10)           | 433<br>(65)   |             |

Figures in brackets indicate the number of experiments.

\* Yield rates (in lbs./acre) of dried grain.



Appendix-I

Statements giving shape and size of plots adopted for crop estimation surveys in different states & agency for field work in respect of states and crops covered by harvest stage inspection programme 1952 - 53.

| State           | Agency for field work       | Crops covered                                       | Shape of plot    | Size of the plot         |
|-----------------|-----------------------------|---|------------------|--------------------------|
| 1               | 2                           | 3   | 4                | 5                        |
| Andhra Pradesh  | Revenue                     | Jowar, Bajra & Ragi                                 | Rect.            | 1/100 acre (50x50 links) |
|                 | Agriculture                 | Sugarcane   | Rect.            | 1/100 acre (50x20 links) |
| Assam           | Spl. Staff                  | Jute and Rape & Mustard                             | Square           | 1/160 acre (16½' x 16½') |
| Bihar           | Revenue                     | Maize, Wheat, Gram & Barley                         | Rect.            | 1/80 acre (33' x 16½')   |
|                 | Amins and Spl. Staff (Dev.) | Sugarcane   | Rect. (variable) | 1/80 acre (33' x 16½')   |
|                 | do-                         | Jute  | Square           | 1/160 acre (16½' x 16½') |
| Gujarat         | Revenue                     | Jowar, Bajra & Wheat                                | Square           | 1/40 acre (33' x 33')    |
| Jammu & Kashmir | Revenue                     | Wheat   | Rect.            | 1/30 acre (33' x 16½')   |
| Madhya Pradesh  | Revenue                     | Jowar, Bajra, Maize, Wheat, Gram, Barley & Linseed. | Rect.            | 1/80 acre (33' x 16½')   |
| Madras          | Revenue                     | Jowar, Bajra & Ragi                                 | Rect.            | 1/100 acre (50x20 links) |
|                 | Agriculture                 | Sugarcane   | Rect.            | 1/30 acre (50x25 links)  |
| Maha-rashtra    | Revenue                     | Jowar, Bajra & Wheat                                | Square           | 1/40 acre (33 x 33')     |
| Mysore          | Revenue                     | Jowar, Ragi, Wheat, Sugar-cane & linseed            | Rect.            | 1/30.9 acre (10x5 mtrs.) |
| Orissa          | Jute Dev.                   | Jute  | Square           | 1/100 acre (16½' x 16½') |

(Contd.)

| 1                | 2               | 3  | 4          | 5                             |
|------------------|-----------------|--|------------|-------------------------------|
| Punjab*          | Revenue         | Maize, Gram & Barley   | Rect.      | 1/80 acre<br>(33' x 16½')     |
|                  | Agriculture     | Wheat and Rape & Mustard   | Rect.      | 1/80 acre<br>(33' x 16½')     |
|                  | Sugar-cane Dev. | Sugarcane  | Rect.      | 1/80 acre<br>(33' x 16½')     |
| Rajas-<br>than   | Revenue         | Jowar, Bajra,<br>Maize, wheat,<br>Gram & Barley                                  | Rect.      | 1/80 acre<br>(33' x 16½')     |
|                  |                 | Linseed and<br>Rape & Mustard  | Square     | 1/40 acre<br>(33' x 33')      |
| Uttar<br>Pradesh | Revenue         | Jowar, Bajra,<br>Maize, Wheat,<br>Gram, Barley,<br>Linseed and<br>Rape & Mustard | Equal<br>△ | 1/92.4 acre<br>of side 33'    |
|                  | Sugar-cane Dev. | Sugarcane  | Rect.<br>& | 1/160 acre<br>(16½' x 16½')   |
|                  |                 |  | Square     | 1/40.5 acre<br>(10x10 metres) |

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\*Plot size of (33' x 11'), 1/132 acre in hilly areas.

Appendix IICentral Driage Experiments, 1962-63

1. The Directorate of NSS initiated the programme of central driage experiments in 1960-61 on a small scale, at the Headquarters (New Delhi). This established the feasibility of carrying out central driage operations at a suitable central place. The central driage experiments were taken up on regular basis from 1961-62 so that driage ratios from them could be readily available for obtaining the yield rates in terms of dried grain from the experiments inspected under the harvest stage inspection programme for which weights of the green produce had been reported by the supervisors.
2. Scale of work: During 1962-63, the supervisors were required to conduct circular cut (of 4' radius) experiments with the ISI instruments in some of the fields selected for harvest stage inspection. They were asked to mail to the headquarters the entire produce (including border plants) obtained from each of the circular cut on food crop for the purposes of central driage experiments at Delhi. The produce was received for a total of 337 experiments in Kharif season and 433 experiments in Rabi season. Of these 25 in Kharif (out of 337) and 28 in Rabi (out of 433) were rejected mainly on account of damage in transit.
3. Procedure for despatch of bags: The produce for driage experiments at Delhi had to be properly sealed in a cloth bag of white drill and mailed as a Registered parcel. The contents of the produce consisted of cobs/earheads for jowar, bajra, maize and ragi and grain for gram and barley. For

wheat the produce consisted of earheads for nearly 50 per cent experiments and grain for the remaining experiments.

4. Driage procedure followed at Headquarters: The procedure for the conduct of these experiments followed at the headquarters is indicated below:-

- (i) Examination of the contents and taking weight to the nearest 5 grams as soon as the bag was received. The weight of empty bag was also noted.
- (ii) The produce was thereafter put in the bag and the closed bag was exposed to the sun daily (excluding rainy days and holidays). The bag was exposed till a constant weight was attained in three consecutive weighments. Weighments were taken on alternate days.
- (iii) When the constancy had been attained the bag was opened and the weight of dried produce noted.
- (iv) In the case of cobs/ear-heads/pods, the produce was threshed and cleaned. The cleaned grain was again exposed to the sun till its weight became steady.

5. Arrangements for storage and driage: For the purpose of storing the bags a steel godrej rack covered with a door like frame of wire netting was kept in a closed verandah. This protected the produce from any possible damage from rain etc. The bags were exposed to the sun daily by placing them on a tarpaulin and covered with hen-coop like structure of wire netting. This arrangement protected the produce from birds etc. and at the same time obviated the necessity for a whole-time worker to keep watch on. The weights were used to be taken in a closed verandah with a counter-balance.

6. Results: Table I.II enclosed gives state-wise and crop-wise driage ratios used for this report together with the source of information.

(v)

Table A.II: Crop-wise driage ratios used, 1962-63Kharif - Food crops

| State            | Kharif Jowar |                  | Bajra        |                  | Maize        |             | Ragi         |             |
|------------------|--------------|------------------|--------------|------------------|--------------|-------------|--------------|-------------|
|                  | Driage ratio | Sou-<br>rce      | Driage ratio | Sou-<br>rce      | Driage ratio | Sou-<br>rce | Driage ratio | Sou-<br>rce |
| 1                | 2            | 3                | 4            | 5                | 6            | 7           | 8            | 9           |
| Andhra Pradesh   | 0.5368       | CDE              | 0.5592       | State<br>1961-62 | -            | -           | 0.4871       | CDE         |
| Bihar            | -            | -                | -            | -                | 0.4462       | CDE         | -            | -           |
| Gujarat          | 0.5259       | CDE              | 0.5968       | CDE              | -            | -           | -            | -           |
| Madhya Pradesh   | 0.4878       | CDE              | 0.4514       | State<br>1961-62 | 0.4596       | CDE         | -            | -           |
| Madras           | 0.5030       | State<br>1961-62 | 0.6260       | State<br>1961-62 | -            | -           | 0.5374       | CDE         |
| Maha-<br>rashtra | 0.5830       | CDE              | 0.5500       | CDE              | -            | -           | -            | -           |
| Mysore           | 0.6241       | State<br>1961-62 | -            | -                | -            | -           | 0.5722       | CDE         |
| Punjab           | -            | -                | -            | -                | 0.3835       | CDE         | -            | -           |
| Rajas-<br>than   | 0.5261       | State<br>1961-62 | 0.5788       | CDE              | 0.4280       | CDE         | -            | -           |
| Uttar<br>Pradesh | 0.5323       | CDE              | 0.5317       | CDE              | 0.4314       | CDE         | -            | -           |

Rabi - Food crops

| State          | Wheat        |             | Gram         |             | Barley       |             | Rabi Jowar   |             |
|----------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|
|                | Driage ratio | Sou-<br>rce | Driage ratio | Sou-<br>rce | Driage ratio | Sou-<br>rce | Driage ratio | Sou-<br>rce |
| 1              | 2            | 3           | 4            | 5           | 6            | 7           | 8            | 9           |
| Andhra Pradesh | -            | -           | -            | -           | -            | -           | 0.5546       | CDE         |
| Bihar          | 0.9367       | CDE         | 0.8372       | CDE         | 0.6544       | CDE         | -            | -           |
| Gujarat        | 0.9395       | CDE         | -            | -           | -            | -           | -            | -           |

(Contd.)

Rabi - Food crops (Contd.)

| State            | Wheat        |                  | Gram         |                  | Barley       |                  | Rabi Jowar   |        |
|------------------|--------------|------------------|--------------|------------------|--------------|------------------|--------------|--------|
|                  | Driage ratio | Source           | Driage ratio | Source           | Driage ratio | Source           | Driage ratio | Source |
| 1                | 2            | 3                | 4            | 5                | 6            | 7                | 8            | 9      |
| Jammu & Kashmir  | 0.9052       | State<br>1961-62 | -            | -                | -            | -                | -            | -      |
| Madhya Pradesh   | 0.9499       | CDE              | 0.9271       | State<br>1961-62 | 0.9406       | State<br>1961-62 | -            | -      |
| Maha-rashtra     | 0.9503       | CDE              | -            | -                | -            | -                | 0.5517       | CDE    |
| Mysore           | 0.8734       | State<br>1959-60 | -            | -                | -            | -                | 0.5421       | CDE    |
| Punjab           | 0.9338       | CDE              | 0.9310       | CDE              | 0.8901       | CDE              | -            | -      |
| Rajas-<br>than   | 0.9512       | CDE              | 0.9234       | CDE              | 0.9562       | CDE              | -            | -      |
| Uttar<br>Pradesh | 0.9436       | CDE              | 0.8972       | CDE              | 0.8902       | CDE              | -            | -      |

Kharif and rabi - Non-food crops

| State             | Jute         |        | Linsed       |                  | Rape & Mustard |                  |
|-------------------|--------------|--------|--------------|------------------|----------------|------------------|
|                   | Driage ratio | Source | Driage ratio | Source           | Driage ratio   | Source           |
| 1                 | 2            | 3      | 4            | 5                | 6              | 7                |
| Assam             | 0.0468       | DEI    | -            | -                | 0.8660         | State<br>1961-62 |
| Bihar             | 0.0494       | DEI    | -            | -                | -              | -                |
| Madhya<br>Pradesh | -            | -      | -            | -                | -              | -                |
| Mysore            | -            | -      | -            | State<br>1960-61 | -              | -                |
| Orissa            | 0.0511       | DEI    | -            | -                | -              | -                |
| Punjab            | -            | -      | -            | -                | 0.9495         | State<br>1960-61 |
| Rajasthan         | -            | -      | 0.9107       | State<br>1961-62 | 0.9587         | State<br>1961-62 |
| Uttar<br>Pradesh  | -            | -      | 0.8330       | State<br>1960-61 | 0.3817         | State<br>1960-61 |

CDE - Central Driage Experiments, 1962-63.  
 DEI - Driage Experiment  
 by grain analysis.

## B.2. *Studies on crop areas*

- B.2.1. . . . Report on some aspects of enumeration and compilation of crop areas in the States.

## C. **Surveys in Development Areas**

### C.1. *Crop estimation surveys*

- C.1.1. . . . Report on the crop estimation survey in development areas, Rabi, 1954-55.  
C.1.2. . . . Report on the crop estimation survey in development areas, 1955-56.  
C.1.3. . . . Report on the crop estimation survey in development areas, 1956-57.  
C.1.4. . . . Report on the crop estimation survey in development areas, 1957-58.  
C.1.5. . . . Report on the crop estimation survey in development areas, Kharif, 1958-59.  
C.1.6. . . . Report on the crop estimation survey in development areas, Rabi, 1958-59.  
C.1.7. . . . Report on the crop estimation survey in development areas, 1959-60.  
C.1.8. . . . Review of crop estimation surveys in development areas, 1955-56 to 1959-60.

### C.2. *Estimation of area brought under improved agricultural practices*

- C.2.1. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Andhra Pradesh, Kharif, 1958-59.  
C.2.2. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Uttar Pradesh, Rabi, 1958-59.  
C.2.3. . . . Consolidated results of surveys for estimation of areas brought under improved agricultural practices, 1961-62.

## D. **Surveys for Estimating Benefits of Irrigation**

### D.1. *Area benefited by minor irrigation works*

- D.1.1. . . . Review of minor irrigation assessment surveys, 1951-52 to 1959-60  
D.1.2. . . . Report on the sample survey for the assessment of the utilisation of tubewells, 1957-58.  
D.1.3. . . . Report on the sample check of new wells (G.M.F.) Rajasthan, 1959.  
D.1.4. . . . Report on the check of minor irrigation works in development areas, Rajasthan, 1959.  
D.1.5. . . . Report on the check of minor irrigation works in development areas, Bihar, 1959.

## E. **In-service Training of Staff**

- E.1. . . . Note on the in-service training of staff.  
E.2. . . . Report on stage II training, Poona, 1961.  
E.3. . . . Report on stage II training, Delhi, 1961.  
E.4. . . . Report on stage III training, Delhi, 1961.  
E.5. . . . Report on stage II training, Delhi, 1962.  
E.6. . . . Report on stage III training, Delhi, 1963.

## F. **Sample Surveys for the Estimation of Fish Catch**

- F.1. . . . Review of the sample surveys for estimating the catch of marine fish, 1950 to 1956.  
F.2. . . . Report on the pilot survey of inland fisheries, Orissa, 1962-63.

## M. **Miscellaneous**

- M.1. . . . Report on the surveys for assessment of additional yield from land reclaimed by Central Tractor Organisation, 1951-52 to 1954-55.

# DIRECTORATE OF NATIONAL SAMPLE SURVEY

(Agricultural Statistics Division)

## List of Publications

### A. Crop Estimation Surveys (State Series)

#### A.1. Annual results

- A.1.1. Consolidated results of crop estimation surveys on principal food crops, 1955-56.
- A.1.2. Consolidated results of crop estimation surveys on principal food crops, 1956-57.
- A.1.3. Consolidated results of crop estimation surveys on principal food crops, 1957-58.
- A.1.4. Consolidated results of crop estimation surveys on principal non-food crops, 1957-58.
- A.1.5. Consolidated results of crop estimation surveys on principal food crops, 1958-59.
- A.1.6. Consolidated results of crop estimation surveys on principal non-food crops, 1958-59.
- A.1.7. Consolidated results of crop estimation surveys on principal food crops, 1959-60.
- A.1.8. Consolidated results of crop estimation surveys on principal non-food crops, 1959-60.
- A.1.9. Consolidated results of crop estimation surveys on principal food crops, 1960-61.
- A.1.10. Consolidated results of crop estimation surveys on principal non-food crops, 1960-61.
- A.1.11. Consolidated results of crop estimation surveys on principal food crops, 1961-62.
- A.1.12. Consolidated results of crop estimation surveys on principal non-food crops, 1961-62.
- A.1.13. Consolidated results of crop estimation surveys on principal food crops, 1949-50 to 1960-61

#### A.2. Supervision of crop cutting experiments

- A.2.1. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Kharif, 1960-61.
- A.2.2. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Rabi, 1960-61.
- A.2.3. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1961-62.
- A.2.4. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1962-63.

#### A.3. Special studies

- A.3.1. Report on central driage experiments, 1960-61.
- A.3.2. Report on the joint crop cutting studies at Bundi (Rajasthan), Kharif, 1960-61.
- A.3.3. Report on the joint crop cutting studies at Barh (Bihar), Rabi, 1960-61.
- A.3.4. Report on central driage experiments, 1961-62.
- A.3.5. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1960-61 and 1961-62.
- A.3.6. Report on Central driage experiments, 1962-63.
- A.3.7. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1962-63.

### B. Surveys for Estimation of Crop Areas

#### B.1. Sample surveys for pre-harvest (advance) estimates of crop acreages

- B.1.1. Report on the sample surveys for pre-harvest (advance) estimates of crop acreages 1955-56.
- B.1.2. Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1956-57 and 1957-58.
- B.1.3. Report on the sample check of field work of the sample survey for pre-harvest (advance) estimates of crop acreages, 1957-58.
- B.1.4. Report on the sample survey for pre-harvest (advance) estimates of crop acreages, 1958-59.
- B.1.5. Review of sample surveys for pre-harvest (advance) estimates of crop acreages, 1953-54 to 1959-60.

(contd. on inner cover)....



mainly on account of large scale substitutions in Bihar. State-wise and crop-wise details of substitutions are given in Table 1 appended.

15.3 It has been pointed out in para 11.4 above that special visits to the sub-sample of villages selected for driage operations were not undertaken in 1962-63. The Directorate, however, as in earlier years, arranged for some driage experiments on food crops to be done centrally at Delhi under controlled conditions. For this purpose, the produce of circular cuts, referred to in para 11.7 above, was sent to Delhi directly from the field.

15.4 In addition to state-wise and crop-wise details regarding response and substitutions, the number of driage experiments conducted centrally are also given in Table 1 appended. Some details of the procedures followed in Central Driage Experiments at Delhi along with the driage ratios used for this report are given in Appendix II. A detailed report\* on Central Driage Experiments, 1962-63, has also been brought out.

#### 16. Estimation procedure

16.1 In the crop estimation surveys in States, sample fields for a specified crop in a village are selected from all the fields growing that crop irrespective of whether that crop alone is sown in a field (pure) or it is sown in mixture with other crops (mixed). The estimate of average yield rate worked out by taking the sample yields as directly obtained from the cuts irrespective of whether a cut was from a pure field or a mixed one is termed as the gross yield rate. If plot yields from mixed fields are

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\*A.3.6- Report on Central Driage Experiments, 1962-63.

**CROP ESTIMATION SURVEYS (STATE SERIES)**

**REPORT ON THE INSPECTION OF CROP CUTTING EXPERIMENTS  
AT HARVEST STAGE ON A RANDOMISED BASIS  
1963-64**

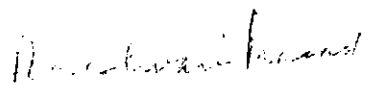
**SERIES**  
A. 2.  
No. 5.

**DIRECTORATE OF NATIONAL SAMPLE SURVEY**  
(Agricultural Statistics Division)  
1964

## FOREWORD

Since 1957-58, crop production estimates of major cereals have become available in India from two independent and parallel series, the NSS and the official, both based on objective methods of measurement of crop areas and yields. The estimates from the two series differ considerably. Undoubtedly, elaborate investigations will be required for finding out the causes of differences. It was felt that the re-orientation of the programme of inspection of field work of the State series crop cutting experiments could give some evidence on the accuracy of the official estimates of yield rates. Accordingly, inspection of crop cutting experiments at harvest stage on a random basis has been organised from 1960-61 onwards. Four reports giving the results of the work carried out in Kharif 1960-61, Rabi 1960-61, 1961-62 and 1962-63, have already been brought out. This report gives the results for 1963-64.

New Delhi  
August 1965.

  
(Rajeshwari Prasad)  
Chief Director, NSS

REPORT ON THE INSPECTION OF CROP CUTTING EXPERIMENTS  
AT HARVEST STAGE ON A RANDOMISED BASIS, 1963-64

1. Introduction

1.1 Since 1950 considerable advance has been made in India towards obtaining crop production estimates of major cereals and other important food-grains on an objective basis by the introduction of yield measurement at harvest time on a random sample of fields. The work of yield measurements on a random sampling basis when introduced was entrusted to the Land Record agency where possible for obvious reasons of convenience and economy, and the work load was kept down to a level which, it was felt, could be tackled by the concerned field officials without undue strain to themselves or without adverse effect on the work. These officials have long been accustomed to the processes of counting and measurements in the course of their land revenue and settlement work and so no serious difficulty was met with in introducing the staff to a procedure involving a rather rigorous adherence to random selection of areas for crop yield measurements. There were, of course, problems of successful implementation. These covered, apart from co-operation from the cultivators, provision of necessary equipment for field work, ensuring effective supervision for ascertaining strict conformity in field to the random sample design, and watching that large non-response was not allowed to occur on account of diversion of the concerned officials to some other work at the time of crop harvest on grounds of urgency or expediency. When an agency is multi-purpose and when it is under the control of another executive department, such questions of effective execution assume no small importance.

1.2 It must be stated that notwithstanding some effort on the part of the Central Government to introduce

which is responsible for crop estimates and which had taken the initiative in establishing a Central Observational Unit to watch on the efficiency of the State series was particularly interested in the adoption of the above approach for reaching a better understanding of the causes leading to rather discrepant estimates of cereal productions between the NSS series and the State series, both claimed to be based on the data collected by scientific and objective methods. Accordingly, a beginning was made in this direction:

(i) by obtaining data on yields on a small sub-sample of fields of the State sample by following the State procedures;

(ii) by obtaining data on yields on the same set of sub-sample of fields by following the NSS procedures;

and (iii) by choosing the sample fields to give them as wide a representative character as feasible rather than confining them to small area in a localised study.

A comparison of the two sets of estimates so obtained through observation of this team with the estimates from the full sample of the State series could give some evidence on the accuracy of the State estimates. In pursuance of the above approach, the programme of spot check was launched in Kharif 1960-61.

1.5 Considering the strength of the Central Supervisory Team, the sample size manageable by it for such a study would be small. Special attention was to be paid to ensure that the field work was carried out according to the prescribed State procedures. If errors were found in the field work of the State officials, the Central observers were to rectify these and to take correct measurements. If the State officials were absent, the Central observers were to do the work themselves. All possible attention was to be paid to avoid any loss of sample observations in the selected sub-sample.

2. Coverage of spot check

2.1 The spot check in 1963-64 covered seven food crops, namely, paddy, jowar (kharif and rabi), bajra, maize, ragi, wheat and barley. All these crops are covered in the NSS series. There were large differences in their estimates of production from NSS and official series during 1957-58, 1958-59, 1959-60 and 1960-61 (see Table 0.1 below).

Table 0.1: Percentage difference in estimates of production between the NSS and official series of crop estimation surveys

| Crop           | 1957-58  | 1958-59  | 1959-60  | 1960-61  |
|----------------|--|--|--|--|
|                | $\frac{\text{NSS-Official}}{\text{Official}} \times 100$ | $\frac{\text{NSS-Official}}{\text{Official}} \times 100$ | $\frac{\text{NSS-Official}}{\text{Official}} \times 100$ | $\frac{\text{NSS-Official}}{\text{Official}} \times 100$ |
| 1              | 2  | 3  | 4  | 5  |
| Paddy          | 11.4   | 15.3   | 15.3   | 23.9   |
| Jowar (Kharif) | 68.3   | 89.0   | 94.0   | 67.0   |
| Bajra          | 51.1   | 58.8   | 60.3   | 41.0   |
| Ragi           | 31.1   | 36.7   | 41.4   | 40.1   |
| Maize          | 73.5   | 104.6  | 73.3   | 68.0   |
| Wheat          | 42.8   | 23.2   | 36.4   | 44.4   |
| Barley         | 18.6   | 26.1   | 37.3   | 60.6   |
| Aggregate      | 32.6   | 36.1   | 37.3   | 33.7   |

2.2 It would have been desirable to cover under spot check the entire area i.e. all States under each crop chosen for the purpose. However, this was not found feasible owing to the limited strength of the Central supervisory staff in the various States. The choice of States was based on the consideration of their relative importance in respect of area and production.

2.3 It will be seen from Table 0.2 below that the spot check covered 14 States in Kharif and 10 States in Rabi 1963-64. The States covered for jowar (Kharif and Rabi), bajra, maize, wheat and barley accounted for about 90 per cent or more of all India production according to official estimates of these crops. The States covered for

paddy accounted for about 82 per cent of all India production. In the case of ragi, however, the States covered account for only 73 per cent of the ragi production of the country.

Table O.2: Percentages of all-India official estimates of production (1962-65) accounted for by States for crops covered in the spot check

A - Kharif

| State                           | Crops covered |           |           |           |           |
|---------------------------------|---------------|-----------|-----------|-----------|-----------|
|                                 | Paddy         | Ma. Jowar | Bajra     | Maize     | Ragi      |
| 1                               | 2             | 3         | 4         | 5         | 6         |
| Andhra Pradesh                  | 11            | 13        | 9         | -         | 14        |
| Assam                           | 5             | -         | -         | -         | -         |
| Bihar                           | 13            | -         | -         | 19        | -         |
| Gujarat                         | 1             | 5         | 13        | 6         | -         |
| Jammu & Kashmir                 | -             | -         | -         | 5         | -         |
| Kerala                          | 3             | -         | -         | -         | -         |
| Madhya Pradesh                  | 7             | 24        | -         | 10        | -         |
| Madras                          | 12            | 6         | 8         | -         | 18        |
| Maharashtra                     | 4             | 24        | 14        | -         | -         |
| Mysore                          | 4             | 10        | -         | -         | 41        |
| Orissa                          | 11            | -         | -         | -         | -         |
| Punjab                          | 1             | -         | 8         | 12        | -         |
| Rajasthan                       | -             | 7         | 24        | 17        | -         |
| Uttar Pradesh                   | 10            | 10        | 16        | 22        | -         |
| <u>Total for States covered</u> | <u>82</u>     | <u>99</u> | <u>92</u> | <u>91</u> | <u>73</u> |

B-- Rabi

| State                           | Crops covered |           |           |
|---------------------------------|---------------|-----------|-----------|
|                                 | Wheat         | Barley    | R. Jowar  |
| 1                               | 2             | 3         | 4         |
| Andhra Pradesh                  | -             | -         | 16        |
| Bihar                           | 5             | 10        | -         |
| Gujarat                         | 3             | -         | -         |
| Jammu & Kashmir                 | 1             | -         | -         |
| Madhya Pradesh                  | 19            | 6         | -         |
| Maharashtra                     | 4             | -         | 52        |
| Mysore                          | -             | -         | 21        |
| Punjab                          | 27            | 6         | -         |
| Rajasthan                       | 10            | 22        | -         |
| Uttar Pradesh                   | 29            | 55        | -         |
| <u>Total for States covered</u> | <u>98</u>     | <u>99</u> | <u>89</u> |

### 3. Sampling Design

3.1 To appreciate the sampling plan adopted for organising the spot check, it would be desirable first to indicate briefly the statistical design adopted for crop estimation surveys in the States. The design, except in Kerala and Orissa, is one of multi-stage random sampling with Tehsils (or Sub-Divisions/R.I. Circles) as the strata, villages within the strata as the primary units, fields within a village as the sampling units at the secondary stage, and finally, a plot (a cut) of a specified size within a sample field as the ultimate unit of sampling. The allocation of experiments among strata is generally made on the joint consideration of the acreage under the crop and number of primary workers available in each stratum such that the work-load, in general, on a member of the field staff can easily be managed in the course of his other duties. As a general basis, about 100 to 120 experiments are planned in the major crop growing districts. The experiments in the case of minor districts are so adjusted that the precision of the estimates for the Divisions and for the State as a whole is generally high. In each selected village, two fields growing the crop in question are selected at random and in each of them one plot of the required size (generally 33' x 16.5') is marked at random for sample harvest. The measurement of yield of a crop within a sample field, which is usually known as a crop cutting experiment, consists in locating and marking a plot of a specified size in the sample field, harvesting and threshing the produce within it, and recording the weight of the produce. In a sub-sample of cases, the produce harvested from the experimental plot is also dried for determining the loss of weight due to



moisture. The size and shape of the sample plot varies from State to State and may be seen in Appendix I.

The field work of the survey comprising selection of fields and crop cutting experiments therein is entrusted to the staff of the State Departments of Revenue and/or Agriculture, depending on the work-load and administrative convenience.

3.3 The spot check was organised by selecting at random a sub-sample of fields out of those chosen in the State series for yield observation. For this purpose, the requisite number of villages, i.e., half the number of experiments proposed for inspection for each crop in each State (except Kerala and Orissa)\*, were selected with equal probability and without replacement from the list of villages selected in the State series. In some of the States the practice of selecting common villages for different crops is followed. The procedure prescribed for selection of villages for the spot check, as in 1962-63, was such that common villages for different crops, to the extent possible, could be selected without excluding any part of the crop coverage in the State series.

#### 4. Sample size

4.1 A total sample of 2,199 experiments - 1,375 experiments in Khar and 824 experiments in Rabi - was proposed to be covered under this programme on the specified crops. State-wise and crop-wise distribution of the same is given in Table 1.

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Sampling design provides for five

Table 0.3: Sample size and distribution of work among supervisors

A - Kharif

| State           | No. of Supervisors | Number of experiments proposed for inspection at harvest stage |       |       |       |      |       | Average No. of experiments per Supervisor |
|-----------------|--------------------|--|-------|-------|-------|------|-------|---|
|                 |                    | Paddy  | Jowar | Bajra | Maize | Ragi | Total |   |
| 1               | 2                  | 3  | 4     | 5     | 6     | 7    | 8     | 9   |
| Andhra Pradesh  | 7                  | 30   | 30    | 20    | -     | 30   | 110   | 15.7                                      |
| Assam           | 4                  | 30   | -     | -     | -     | -    | 50    | 12.5                                      |
| Bihar           | 8                  | 108  | -     | -     | 50    | -    | 158   | 19.8                                      |
| Gujarat         | 4                  | 20   | 20    | 40    | 20    | -    | 100   | 25.0                                      |
| Jammu & Kashmir | 2                  | -  | -     | -     | 20    | -    | 20    | 10.0                                      |
| Kerala          | 1                  | 55   | -     | -     | -     | -    | 55    | 55.0                                      |
| Madhya Pradesh  | 8                  | 24   | 36    | -     | 40    | -    | 100   | 12.5                                      |
| Madras          | 5                  | 24   | 20    | 20    | -     | 20   | 84    | 16.8                                      |
| Maharashtra     | 8                  | 30   | 60    | 50    | -     | -    | 140   | 17.5                                      |
| Mysore          | 7                  | 24   | 36    | -     | -     | 50   | 110   | 15.7                                      |
| Orissa          | 4                  | 60   | -     | -     | -     | -    | 60    | 15.0                                      |
| Punjab          | 8                  | 30   | -     | 44    | 44    | -    | 118   | 14.8                                      |
| Rajasthan       | 6                  | -  | 20    | 50    | 40    | -    | 110   | 18.3                                      |
| Uttar Pradesh   | 11                 | 40   | 30    | 30    | 60    | -    | 160   | 14.5                                      |
| Total           | 83                 | 495  | 252   | 254   | 274   | 100  | 1375  | 16.6                                      |

B - Rabi

| State           | No. of Supervisors | Number of experiments proposed for inspection at harvest stage |        |          |       | Average No. of expts. per Supervisor |
|-----------------|--------------------|--|--------|----------|-------|--------------------------------------|
|                 |                    | Wheat  | Barley | R. Jowar | Total |                                      |
| 1               | 2                  | 3  | 4      | 5        | 6     | 7                                    |
| Andhra Pradesh  | 4                  | -  | -      | 50       | 50    | 12.5                                 |
| Bihar           | 8                  | 50   | 40     | -        | 90    | 11.2                                 |
| Gujarat         | 6                  | 50   | -      | -        | 50    | 8.3                                  |
| Jammu & Kashmir | 2                  | 20   | -      | -        | 20    | 10.0                                 |
| Madhya Pradesh  | 7                  | 60   | 24     | -        | 84    | 12.0                                 |
| Maharashtra     | 8                  | 40   | -      | 50       | 90    | 11.2                                 |
| Mysore          | 4                  | 20   | -      | 40       | 60    | 15.0                                 |
| Punjab          | 9                  | 70   | 50     | -        | 120   | 13.3                                 |
| Rajasthan       | 8                  | 50   | 50     | -        | 100   | 12.5                                 |
| Uttar Pradesh   | 12                 | 90   | 70     | -        | 160   | 13.3                                 |
| Total           | 68                 | 450  | 234    | 140      | 824   | 12.1                                 |

It will be seen from the above table that nearly 500 experiments on paddy, 450 on wheat, about 250 each on jowar, bajra, maize and barley, 100 on ragi and 140 on Rabi jowar were proposed to be inspected. Apart from the considerations referred to in para 2.2 above, the strength of the Central observers in each State was also kept in view while choosing crops and States and distributing experiments over States.

#### 5. Personnel

5.1 In all, 83 and 68 supervisors of the Agricultural Statistics Division of the Directorate of NSS, distributed over the different States in Kharif and Rabi 1963-64 respectively, were entrusted with the inspection programme. These supervisors, although many of them had considerable experience in this type of work, were adequately trained in the operation of the programme. The programme in each State was formulated, supervised and co-ordinated by the respective Regional Officers incharge of the Central work in the States. Officers from the Headquarters (New Delhi) also associated themselves in providing necessary guidance. As will be seen from Table 0.3 above, the work-load per person for inspection at harvest stage worked out, on an average, to nearly 8 villages (16 experiments) in Kharif and 6 villages (12 experiments) in Rabi.

#### 6. Items of work

6.1 Selection of villages was done at the regional offices at State headquarters with the help of lists of villages selected for State series which were provided by the office of the State Bureau/Agricultural Statistician.

6.2 The field work of crop cutting experiments in States is done in three phases. The first phase of work consists in identifying the sample villages, selecting fields for yield observations according to the procedure

prescribed and fixing the dates of harvesting for yield measurements. The second phase of work is done on the harvesting day and consists of demarcating the area of sample harvest from a randomly located point and taking yield observation therefrom. In the third phase of the work which is done on a sub-sample of the yield measurements, the yield of the dried grain is weighed after proper processing. Under the normal procedure observations by the Central team are made at one or more of these phases, those carried out in the first phase being termed as pre-harvest check, in the second phase as harvest check and the third phase as post-harvest (or drilage) check. In the last phase, the Central team also obtains with advantage through enquiry information on the manner in which the work of earlier phases was carried out. In the sample check of Kharif 1960-61 a preliminary visit was paid by the supervisor to each sample village in advance of harvesting period to ensure that the primary worker had done the selection of fields etc. In 1963-64, like 1961-62 and 1962-63, efforts were made to avoid preliminary visits for obtaining the dates of harvest for the selected fields. In the absence of this information, however, preliminary visit had to be undertaken to avoid loss of experiments. Steps were also taken to ensure that the supervisors cover all the experiments. This involved arrangements for getting information on chances, if any, in the dates of harvest. In a few cases, a separate visit was actually found necessary to ascertain the harvesting dates.

6.5 A visit was paid to the village to observe actual conduct of experiments for checking the accuracy of the field work and getting weight of green crop at harvest stage. The green crop at harvest stage consisted of cobs for jowar (kharif/rabi), bajra and maize; earheads for ragi; and grain for paddy, wheat and barley. For obtaining

the weight of grain, some times prolonged stay in the sample village or another visit at the time of threshing and recording the weight was involved. Some times, the dates of harvesting of two experiments in a village were different and some times the harvesting dates were changed at the last minute owing to vagaries of weather or convenience of cultivators. In such cases, more than one visit had to be paid to the village at the harvest stage.

6.4 In Kharif 1960-61, if the village selected for the spot check programme belonged to the sub-sample of villages selected for driage operations in the State series, then the supervisor was required to pay a subsequent visit for observing these operations also. As the Central Driage Experiments at Delhi were continued in 1963-64, it was decided not to pay a special visit for driage experiments during 1963-64. The details of number of visits paid, on an average, to a sample village at pre-harvest and harvest stages are given in Table 0.4 below:-

Table 0.4: Number of visits per village

A - Kharif

| State           | Average number of visits per village |         |       |
|-----------------|--------------------------------------|---------|-------|
|                 | Pre-harvest                          | Harvest | Total |
| 1               | 2                                    | 3       | 4     |
| Andhra Pradesh  | 0.4                                  | 1.0     | 1.4   |
| Assam           | 0.2                                  | 1.0     | 1.2   |
| Bihar           | 0.5                                  | 1.0     | 1.5   |
| Goa             | 0.2                                  | 1.1     | 1.3   |
| Jammu & Kashmir | 0.0                                  | 1.0     | 1.0   |
| Kerala          | 1.4                                  | 1.9     | 3.3   |
| Madhya Pradesh  | 0.5                                  | 1.1     | 1.6   |
| Madras          | 1.0                                  | 1.4     | 2.4   |
| Maharashtra     | 0.7                                  | 1.1     | 1.8   |
| Orissa          | 1.0                                  | 1.1     | 2.1   |
| Punjab          | 0.8                                  | 1.2     | 2.0   |
| Rajasthan       | 0.8                                  | 1.0     | 1.8   |
| Uttar Pradesh   | 0.0                                  | 1.0     | 1.0   |
| Total           | 0.5                                  | 1.1     | 1.6   |

Table 0.4 (Contd.): Number of visits per village

B - Rabi

| State           | Average number of visits per village |         |       |
|-----------------|--------------------------------------|---------|-------|
|                 | Pre-harvest                          | Harvest | Total |
| 1               | 2                                    | 3       | 4     |
| Andhra Pradesh  | 0.0                                  | 1.0     | 1.0   |
| Bihar           | 0.8                                  | 1.1     | 1.9   |
| Gujarat         | 0.5                                  | 1.0     | 1.5   |
| Jammu & Kashmir | 0.0                                  | 1.0     | 1.0   |
| Madhya Pradesh  | 0.5                                  | 1.0     | 1.5   |
| Maharashtra     | 0.3                                  | 1.1     | 1.4   |
| Mysore          | 0.7                                  | 1.1     | 1.8   |
| Punjab          | 0.6                                  | 1.4     | 2.0   |
| Rajasthan       | 0.5                                  | 1.4     | 1.9   |
| Uttar Pradesh   | 0.0                                  | 1.2     | 1.2   |
| Total           | 0.6                                  | 1.1     | 1.7   |

6.5 The programme of work thus generally involved, on an average, about  $1\frac{1}{2}$  to 2 visits to a sample village. The average number of visits per village was the highest (leaving out Kerala where the number of cuts/village is 5), namely, 2.4 in Madras in Kharif and 2.0 in Punjab during Rabi. It was the lowest, namely, 1.0 during Kharif and Rabi in Uttar Pradesh and Andhra Pradesh respectively.

6.6 According to past experience, a supervisor is required to spend, on an average, about 2 days for each visit to a village.

6.7 In addition to the inspection at harvest stage of a State experimental cut, the supervisors were also required to take yield observations with the help of a circular cut (radius 4') instrument on a sub-sample of fields to compare the yields obtained from these with the State cuts. The results relating to circular cuts have been discussed in a separate report\*. It may be mentioned

\* A.3.9 - Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1963-64.

that during the spare time available to the supervisors, in the course of inspection at harvest stage, they inspected crop cutting experiments outside the present programme and attended to inspection of field work of other surveys relating to agricultural statistics.

#### 7. Formation of zones

7.1 While formulating the programme of work, encouraged by the experience of earlier years, it was considered desirable to form compact zones (not necessarily non-overlapping) each consisting of 6 to 8 sample villages to be assigned to one supervisor. The formation of these zones was naturally based on the consideration of harvesting period, location of sample points and transport facilities available. By and large, this arrangement was found workable. It had, however, to be kept flexible to enable suitable decisions to be taken from the control room at the regional office for making necessary changes on the basis of the dates of harvesting or changes in the same received from time to time from various sample points.

#### 8. Problems faced in the execution of the programme

8.1 The major problem faced in the execution of harvest stage inspection programme, like the earlier years, was the disturbance caused by sudden changes in the dates of harvesting; though, as usual, these were fixed earlier in consultation with the cultivators, etc. On account of there is considerable risk of losing observation at sample harvest. This was, however, kept to the minimum by maintaining a close touch with the primary workers, officials and some times even cultivators and other responsible persons in the village. An idea of the extent of this problem can be had from the fact that in nearly half of the number of cases the originally fixed harvesting

dates had to be changed. The percentage of the experiments, separately for each crop, for which the dates had to be changed, were as under:-

| Crop               | Percentage of expts. where harvest date was changed | Crop               | Percentage of expts. where harvest date was changed |
|--------------------|---|--------------------|---|
|                    | <u>KHARIF</u>                                       |                    | <u>RABI</u>   |
| Paddy              | 34  | Wheat              | 49  |
| Kharif Jowar       | 68  | Barley             | 36  |
| Rajra              | 51  | Rabi Jowar         | 57  |
| Maize              | 43  | All crops combined | 46  |
| Ragi               | 53  |                    |   |
| All crops combined | 46  |                    |   |

8.2 On the other hand, some times there were gaps (i) between harvesting dates of two successive experiments, and (ii) between harvesting and threshing operations for the same experiment. As stated earlier, these gaps were utilized for carrying out other items of work. But the other items of work had to be done only after ensuring that the work of the main programme did not suffer.

#### 9. Period of field work

9.1 The field work began in each State about two weeks before the harvesting season of the crops covered in the State and came to a close as soon as the harvesting season was over. In most of the States of northern India harvesting season was spread over nearly 3 months in Kharif season and over nearly 2 months in Rabi season. In between the two seasons there was a gap of about 1 - 2 months. In southern States, however, the harvesting season of Kharif crops was spread over 4 - 5 months. Table O.5 below gives the main harvesting periods of the crops covered by the programme.



Table 0.5: Main harvesting periods to the nearest week

KHARIF

| State                       | Duration | Paddy |      | Rh. Jowar |      | Rajra |      | Mango |      | Reg.  |
|-----------------------------|----------|-------|------|-----------|------|-------|------|-------|------|-------|
|                             |          | Month | Week | Month     | Week | Month | Week | Month | Week |       |
| 1                           | 2        | 3     | 4    | 5         | 6    | 7     | 8    | 9     | 10   | 11    |
| Andhra Pradesh              | From     | Nov.  | III  | Sept.     | IV   | Sept. | I    | -     | -    | Aug.  |
| (Abi)                       | To       | Dec.  | IV   | Dec.      | III  | Oct.  | II   | -     | -    | Nov.  |
| (Tabi)                      | From     | April | IV   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | May   | III  | -         | -    | -     | -    | -     | -    | -     |
| Assam (Autumn)              | From     | Aug.  | III  | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Sept. | III  | -         | -    | -     | -    | -     | -    | -     |
| (winter)                    | From     | Nov.  | IV   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Dec.  | IV   | -         | -    | -     | -    | -     | -    | -     |
| Bihar (Autumn)              | From     | Sept. | II   | -         | -    | -     | -    | Aug.  | II   | -     |
|                             | To       | Oct.  | I    | -         | -    | -     | -    | Sept. | IV   | -     |
| (Winter)                    | From     | Nov.  | IV   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Dec.  | II   | -         | -    | -     | -    | -     | -    | -     |
| Gujarat                     | From     | Oct.  | II   | Oct.      | II   | Sept. | II   | Sept. | II   | -     |
|                             | To       | Nov.  | II   | Dec.      | I    | Oct.  | IV   | Oct.  | I    | -     |
| Jammu & Kashmir             | From     | -     | -    | -         | -    | -     | -    | Sept. | III  | -     |
|                             | To       | -     | -    | -         | -    | -     | -    | Oct.  | II   | -     |
| Kerala (Kanni)              | From     | July  | IV   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Sept. | II   | -         | -    | -     | -    | -     | -    | -     |
| (Kumbham)                   | From     | Dec.  | II   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Feb.  | III  | -         | -    | -     | -    | -     | -    | -     |
| (Punja)                     | From     | March | IV   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | May   | II   | -         | -    | -     | -    | -     | -    | -     |
| Madhya Pradesh              | From     | Oct.  | II   | Nov.      | III  | -     | -    | Aug.  | IV   | -     |
|                             | To       | Nov.  | IV   | Dec.      | II   | -     | -    | Oct.  | II   | -     |
| Madras (Paddy 1st)          | From     | Oct.  | II   | Dec.      | I    | July  | III  | -     | -    | Aug.  |
|                             | To       | Feb.  | IV   | April     | IV   | March | III  | -     | -    | Nov.  |
| (Paddy 2nd)                 | From     | Jan.  | I    | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Feb.  | IV   | -         | -    | -     | -    | -     | -    | -     |
| Uttar Pradesh               | From     | Oct.  | II   | Nov.      | II   | Sept. | II   | -     | -    | -     |
|                             | To       | Nov.  | II   | Dec.      | IV   | Oct.  | IV   | -     | -    | -     |
| Mysore                      | From     | Sept. | IV   | Sept.     | IV   | -     | -    | -     | -    | Sept. |
|                             | To       | Dec.  | IV   | Dec.      | II   | -     | -    | -     | -    | Dec.  |
| Orissa                      | From     | Sept. | II   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Oct.  | II   | -         | -    | -     | -    | -     | -    | -     |
| Punjab                      | From     | Oct.  | I    | -         | -    | Sept. | II   | Aug.  | IV   | -     |
|                             | To       | Nov.  | II   | -         | -    | Nov.  | II   | Oct.  | II   | -     |
| Rajasthan                   | From     | -     | -    | Sept.     | III  | Sept. | I    | Sept. | II   | -     |
|                             | To       | -     | -    | Nov.      | III  | Oct.  | IV   | Oct.  | IV   | -     |
| Uttar Pradesh (Early Paddy) | From     | Sept. | II   | Nov.      | II   | Oct.  | III  | Sept. | II   | -     |
|                             | To       | Oct.  | II   | Dec.      | II   | Nov.  | I    | Oct.  | I    | -     |
| (Late Paddy)                | From     | Nov.  | II   | -         | -    | -     | -    | -     | -    | -     |
|                             | To       | Dec.  | I    | -         | -    | -     | -    | -     | -    | -     |

Table 0.5 (Contd.): Main harvesting periods to the nearest week

RABI

| State           | Duration | Wheat |      | Barley |      | Rabi Jowar |      |
|-----------------|----------|-------|------|--------|------|------------|------|
|                 |          | Month | Week | Month  | Week | Month      | Week |
| 1               | 2        | 3     | 4    | 5      | 6    | 7          | 8    |
| Andhra Pradesh  | From     | -     | -    | -      | -    | Jan.       | II   |
|                 | To       | -     | -    | -      | -    | Feb.       | IV   |
| Bihar           | From     | March | II   | March  | IV   | -          | -    |
|                 | To       | April | II   | April  | III  | -          | -    |
| Gujarat         | From     | Jan.  | III  | -      | -    | -          | -    |
|                 | To       | March | III  | -      | -    | -          | -    |
| Jammu & Kashmir | From     | April | II   | -      | -    | -          | -    |
|                 | To       | July  | III  | -      | -    | -          | -    |
| Madhya Pradesh  | From     | Feb.  | II   | March  | II   | -          | -    |
|                 | To       | March | III  | March  | IV   | -          | -    |
| Maharashtra     | From     | Jan.  | II   | -      | -    | Jan.       | II   |
|                 | To       | March | IV   | -      | -    | Feb.       | IV   |
| Mysore          | From     | Jan.  | IV   | -      | -    | Jan.       | IV   |
|                 | To       | Feb.  | II   | -      | -    | March      | I    |
| Punjab          | From     | April | I    | March  | II   | -          | -    |
|                 | To       | April | IV   | April  | II   | -          | -    |
| Rajasthan       | From     | March | III  | March  | II   | -          | -    |
|                 | To       | April | II   | April  | II   | -          | -    |
| Uttar Pradesh   | From     | March | III  | March  | II   | -          | -    |
|                 | To       | April | II   | April  | II   | -          | -    |

10. Response

10.1 Over-all response: Of the total number of 2,199 experiments proposed, as many as 2,011 (92 per cent) experiments were spotchecked at harvest stage completely. state-wise and crop-wise details are given in Table 1 appended. The number of experiments inspected for all crops put together are given below separately for Kharif and Rabi seasons:-

|              | <u>Planned</u> | <u>Inspected</u> | <u>Percentage inspected</u> |
|--------------|----------------|------------------|-----------------------------|
| Kharif       | 1,375          | 1,237            | 90                          |
| Rabi         | 824            | 774              | 94                          |
| <b>Total</b> | <b>2,199</b>   | <b>2,011</b>     | <b>92</b>                   |

It will be seen from Table 1 that the number of experiments inspected was nearly 95 per cent or more for bajra, ragi, wheat and barley; about 90 per cent for paddy and Rabi jowar; and about 85 per cent for Kharif jowar and maize.

10.2 A substitution would take place if the field, which had been selected according to the procedures laid down, was found harvested at the time of selection. Since this can affect the results, special care was taken to see that the percentage of such cases was the bare minimum. Of the experiments inspected in Kharif, in about 8 per cent cases, sample harvesting was done in the fields substituted for the initially selected random fields. For Rabi crops, the percentage of such cases was about 7. State-wise and crop-wise details of substitutions are given in Table 1 appended.

10.3 It has been pointed out in para 6.4 above that special visits to the sub-sample of villages selected for drriage operations were not undertaken in 1963-64. The Directorate, however, as in earlier years, arranged for some drriage experiments to be done centrally at Delhi under controlled conditions. For this purpose, the produce of circular cuts, referred to in para 6.7 above, was sent to Delhi directly from the field.

10.4 In addition to state-wise and crop-wise details of drriage response and substitutions, the number of drriage experiments conducted centrally are also given in Table 1 appended. Some details of the procedures followed in Central Drriage Experiments at Delhi along with the drriage ratings used for this report are given in Appendix II. A detailed report\* on Central Drriage Experiments, 1963-64, has also been brought out.

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\* 7.8 - Report on Central Drriage Experiments, 1963-64

## 11. Estimation procedure

11.1 In the crop estimation surveys in States, sample fields for a specified crop in a village are selected from all the fields growing that crop irrespective of whether that crop alone is sown in a field (pure) or it is sown in mixture with other crops (mixed). The estimate of average yield rate worked out by taking the sample yields as directly obtained from the cuts irrespective of whether a cut was from a pure field or a mixed one is termed as the gross yield rate. If plot yields from mixed fields are divided by the corresponding proportion of area under the crop in the field obtained by eye estimation and then added to the plot yields from all the plots with pure crop the resulting estimate of average yield is termed as the net yield rate.

11.2 From the data of experiments inspected under the programme, state-wise gross and net yield rates were obtained together with the standard errors of the net yield rates. The yield rate of a crop/sub-crop at State level was obtained as a simple average in terms of green produce and then multiplied with the corresponding drilage ratio. It has been pointed out above that central drilage experiments were organised at Delhi on food crops during 1963-64. The drilage ratios, based on adequate number of central drilage experiments (nearly 10 or more at state level) wherever available, were made use of. In the remaining cases and the latest drilage ratios received from the states were used.

11.3 The yield rates in terms of dried grain were pooled over sub-crops/states by using the respective crop areas as weights. The standard errors of the estimates were obtained from the usual formula for two stage simple random sampling.

## 12. Results

12.1 Table O.6 below gives state-wise and crop-wise net yield rates based on experiments inspected under the present programme. The yield rates are in terms of dried grain.

Table 0.6: Net yield rates (dried grain in lbs./acre)

KHARIF

| State           | Rice          |            |        | Kharif Jowar  |            |        | Baira         |            |        | Maize         |            |        | Ragi          |            |        |
|-----------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                 | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. |
|                 | 2             | 3          | 4      | 5             | 6          | 7      | 8             | 9          | 10     | 11            | 12         | 13     | 14            | 15         | 16     |
| Andhra Pradesh  | 25            | 1237       | 11.8   | 28            | 399        | 25.7   | 18            | 383        | 30.6   | -             | -          | -      | 23            | 507        | 16.6   |
| Assam           | 38            | 991        | 7.1    | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Bihar           | 106           | 857        | 4.4    | -             | -          | -      | -             | -          | -      | 43            | 1134       | 9.8    | -             | -          | -      |
| Gujarat         | 18            | 749        | 23.1   | 14            | 208        | 58.8   | 38            | 393        | 14.4   | 19            | 819        | 19.8   | -             | -          | -      |
| Jammu & Kashmir | -             | -          | -      | -             | -          | -      | -             | -          | -      | 13            | 981        | 28.8   | -             | -          | -      |
| Kerala          | 52            | 1163       | 1.0    | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh  | 19            | 683        | 18.7   | 33            | 393        | 15.7   | -             | -          | -      | 36            | 930        | 5.9    | -             | -          | -      |
| Madras          | 24            | 1289       | 15.9   | 19            | 519        | 28.2   | 20            | 389        | 23.0   | -             | -          | -      | 20            | 993        | 16.0   |
| Maharashtra     | 30            | 795        | 16.6   | 57            | 383        | 3.8    | 50            | 213        | 4.1    | -             | -          | -      | -             | -          | -      |
| Mysore          | 24            | 1213       | 13.6   | 27            | 507        | 31.7   | -             | -          | -      | -             | -          | -      | 46            | 713        | 13.4   |
| Orissa          | 35            | 964        | 6.2    | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Punjab          | 30            | 689        | 14.8   | -             | -          | -      | 44            | 400        | 15.6   | 42            | 1145       | 11.2   | -             | -          | -      |
| Rajasthan       | -             | -          | -      | 18            | 176        | 31.9   | 50            | 169        | 27.4   | 34            | 794        | 10.1   | -             | -          | -      |
| Uttar Pradesh   | 39            | 667        | 13.4   | 23            | 473        | 29.6   | 28            | 661        | 22.0   | 41            | 645        | 8.8    | -             | -          | -      |
| States covered  | 443           | 931        | 4.0    | 219           | 374        | 8.6    | 243           | 300        | 9.0    | 233           | 901        | 4.9    | 94            | 749        | 9.3    |

Note: Out turn of rice has been taken as 2/3 that of paddy

Table 0.6 (Contd.): Net yield rates (dried grain in lbs./acre)

RABI

| State           | Wheat         |            |        | Barley        |            |        | Rabi Jowar    |            |        |
|-----------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                 | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. | No. of expts. | Yield rate | % S.E. |
| 1               | 2             | 3          | 4      | 5             | 6          | 7      | 8             | 9          | 10     |
| Andhra Pradesh  | -             | -          | -      | -             | -          | -      | 44            | 203        | 18.2   |
| Bihar           | 50            | 453        | 10.5   | 40            | 435        | 14.9   | -             | -          | -      |
| Gujarat         | 46            | 698        | 6.3    | -             | -          | -      | -             | -          | -      |
| Jammu & Kashmir | 20            | 444        | 13.0   | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh  | 53            | 483        | 13.2   | 19            | 669        | 41.0   | -             | -          | -      |
| Maharashtra     | 37            | 508        | 18.2   | -             | -          | -      | 43            | 508        | 20.2   |
| Mysore          | 18            | 319        | 21.8   | -             | -          | -      | 38            | 319        | 15.1   |
| Punjab          | 67            | 1019       | 9.7    | 49            | 601        | 18.9   | -             | -          | -      |
| Rajasthan       | 49            | 606        | 11.2   | 47            | 1097       | 15.9   | -             | -          | -      |
| Uttar Pradesh   | 86            | 624        | 8.4    | 68            | 717        | 14.4   | -             | -          | -      |
| States covered  | 426           | 633        | 4.7    | 223           | 731        | 9.5    | 125           | 410        | 14.8   |

The results suggest the following observations:-

(i) The yield rates at all India level i.e. for the States covered, have been estimated with standard errors of the order of 4 per cent for rice; 5 per cent for maize and wheat; 9 per cent for kharif jowar, bajra and ragi; 10 per cent for barley; and 15 per cent for rabi jowar. Covering all the food crops and states together, the combined yield rate (by using appropriately the respective areas as weights) was estimated with standard error of the order of 3 per cent.

(ii) The spot check was not aimed at providing state level estimates as the spread of the sample over states would suggest. The standard errors of yield estimates are, therefore, rather high at this level. Nevertheless, the yield has been estimated with standard error less than 10 per cent at the state level for rice in Assam, Bihar, Kerala and Orissa; for kharif jowar and bajra in Maharashtra; for maize in Bihar, Madhya Pradesh and Uttar Pradesh; and for wheat in Gujarat, Punjab and Uttar Pradesh.

(iii) Considering food crops, the yield estimate per acre is of the order of 900 lbs. for rice and maize; 700 lbs. for ragi and barley; 600 lbs. for wheat; 400 lbs. for jowar (Kharif and Rabi); and 300 lbs. for bajra.

### 12.3 Comparison with yield rates from the State series:

It would be interesting to compare the yield rates obtained from the present harvest stage inspection programme with the corresponding yield estimates obtained from the State series. These comparisons are given in Table O.7 below. It may be noted that the plot yields from the fields selected for the present inspection programme have been included in the State tabulation in obtaining estimates for the State series.

Table 0.7: Comparison of yield rates (Net)

A - KHARIF

| State | Net yield rates (lbs./acre)     |                       | Percentage Difference<br>(Col.2-Col.3<br>Col.2 x100) |
|-------|---------------------------------|-----------------------|--|
|       | State series<br>(Final 1963-64) | Harvest<br>inspection |  |
| 1     | 2                               | 3                     | 4  |

RICE

|                |      |      |       |
|----------------|------|------|-------|
| Andhra Pradesh | 1153 | 1357 | -16.0 |
| Assam          | 915  | 991  | - 8.3 |
| Bihar          | 781  | 867  | -11.0 |
| Gujarat        | 821  | 749  | 8.8   |
| Kerala         | 1249 | 1163 | 6.8   |
| Madhya Pradesh | 711  | 685  | 3.9   |
| Madras         | 1307 | 1299 | 1.4   |
| Maharashtra    | 1025 | 795  | 22.4  |
| Mysore         | 1270 | 1213 | 4.5   |
| Orissa         | 877  | 964  | - 9.9 |
| Punjab         | 1029 | 689  | 33.0  |
| Uttar Pradesh  | 670  | 667  | 0.4   |
| States covered | 906  | 531  | - 2.7 |

JOWAR

|                |     |     |       |
|----------------|-----|-----|-------|
| Andhra Pradesh | 525 | 309 | 24.0  |
| Gujarat        | 211 | 208 | 1.4   |
| Madhya Pradesh | 587 | 393 | 33.0  |
| Madras         | 495 | 519 | - 4.8 |
| Maharashtra    | 538 | 333 | 28.8  |
| Mysore         | 489 | 507 | - 3.7 |
| Rajasthan      | 237 | 176 | 25.7  |
| Uttar Pradesh  | 501 | 473 | 5.6   |
| States covered | 468 | 374 | 20.1  |

BAJRA

|                |     |     |       |
|----------------|-----|-----|-------|
| Andhra Pradesh | 500 | 388 | 22.4  |
| Gujarat        | 481 | 398 | 17.3  |
| Madras         | 445 | 389 | 12.6  |
| Maharashtra    | 245 | 215 | -13.1 |
| Punjab         | 349 | 400 | -14.5 |
| Rajasthan      | 169 | 169 | 0.0   |
| Uttar Pradesh  | 475 | 661 | -39.2 |
| States covered | 302 | 310 | 0.7   |

Note: Cut turn of rice has been taken as 2/3 that of paddy



Table 0.7 (Contd.): Comparison of yield rates (Net)

| <u>KHARIF</u>   |      |      |       |
|-----------------|------|------|-------|
| 1               | 2    | 3    | 4     |
| <u>MAIZE</u>    |      |      |       |
| Bihar           | 970  | 1134 | -16.9 |
| Gujarat         | 957  | 819  | 14.4  |
| Jammu & Kashmir | 1103 | 981  | 11.1  |
| Madhya Pradesh  | 1105 | 930  | 15.0  |
| Punjab          | 1227 | 1145 | 6.7   |
| Rajasthan       | 812  | 794  | 2.2   |
| Uttar Pradesh   | 635  | 645  | - 1.6 |
| States covered  | 915  | 901  | 1.5   |
| <u>RABI</u>     |      |      |       |
| Andhra Pradesh  | 777  | 597  | 23.2  |
| Madras          | 821  | 993  | -20.9 |
| Mysore          | 799  | 713  | 10.8  |
| States covered  | 799  | 749  | 6.3   |
| <u>R A B I</u>  |      |      |       |
| <u>WHEAT</u>    |      |      |       |
| Bihar           | 546  | 453  | 17.0  |
| Gujarat         | 733  | 698  | 12.0  |
| Jammu & Kashmir | 536  | 444  | 24.2  |
| Madhya Pradesh  | 577  | 483  | 10.1  |
| Maharashtra     | 342  | 503  | -48.5 |
| Mysore          | 257  | 319  | -11.2 |
| Punjab          | 1069 | 1019 | 4.7   |
| Rajasthan       | 684  | 606  | 11.4  |
| Uttar Pradesh   | 616  | 624  | - 1.3 |
| States covered  | 656  | 633  | 3.5   |
| <u>BARLEY</u>   |      |      |       |
| Bihar           | 504  | 435  | 13.7  |
| Madhya Pradesh  | 538  | 669  | -24.6 |
| Punjab          | 699  | 601  | 14.0  |
| Rajasthan       | 943  | 1097 | -16.3 |
| Uttar Pradesh   | 621  | 717  | -15.5 |
| States covered  | 657  | 731  | -11.3 |
| <u>JOVAR</u>    |      |      |       |
| Andhra Pradesh  | 452  | 303  | 55.1  |
| Maharashtra     | 435  | 508  | -16.8 |
| Mysore          | 410  | 319  | 22.2  |
| States covered  | 431  | 410  | 4.9   |

12.4 Comparing the inspection results with the State series results, it will be observed that <sup>at</sup> All India level i.e. for all the States covered, the differences were less than 5 per cent for rice, bajra, maize, wheat and rabi jowar. The difference was 20 per cent for kharif jowar, 12<sup>1</sup>/<sub>2</sub> per cent for barley and 6 per cent for ragi.

12.5 From the standard errors of the yield rates based on harvest stage inspection data alone, the differences do not appear to be statistically significant except in the case of Kharif jowar.

12.6 Out of 54 comparisons in all at State level, the differences (State estimate - Central estimate) are negative in 18 cases and positive in 36 cases.

### 13. Classificatory analysis

13.1 Although the object of the programme was chiefly to estimate the yield per acre, information was collected on certain items of cultivation practices. The data were accordingly analysed for obtaining separately the estimates of gross and net yields for each of the two sub-categories of fields under the following four categories which could be of special practical interest:-

| <u>Category</u> | <u>Sub-categories</u>                                       |
|-----------------|---|
| (1)             | Irrigated, Un-irrigated.                                    |
| (2)             | Manured, Not manured.                                       |
| (3)             | Improved seed, Local seed.                                  |
| (4)             | Crops sown singly (Pure),<br>Crops sown in mixture (Mixed). |

The detailed state-wise and crop-wise results by categories are given in Table 2 appended. The summary results for individual crops at all India level i.e. for the states covered, are presented in Table 0.8 below:-

**Table 0.8: Classificatory analysis - Yield rates (lbs/acre of dried grain)**

| Crop | Category-1     |                       | Category-2 |                | Category-3            |               | Category-4 |       | Com-<br>bined |
|------|----------------|-----------------------|------------|----------------|-----------------------|---------------|------------|-------|---------------|
|      | Irri-<br>gated | Un-<br>irri-<br>gated | Manured    | Not<br>manured | Im-<br>proved<br>seed | Local<br>seed | Pure       | Mixed |               |
| 1    | 2              | 3                     | 4          | 5              | 6                     | 7             | 8          | 9     | 10            |

KHARIF

GROSS

|                 |               |              |               |              |             |              |              |              |              |
|-----------------|---------------|--------------|---------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Rice            | 1153<br>(139) | 823<br>(304) | 1000<br>(219) | 864<br>(224) | 982<br>(60) | 932<br>(383) | 937<br>(426) | 452<br>(17)  | 925<br>(443) |
| Kharif<br>Jowar | -             | -            | 545<br>(39)   | 256<br>(180) | -           | -            | 294<br>(72)  | 254<br>(147) | 290<br>(219) |
| Bajra           | -             | -            | 623<br>(47)   | 212<br>(201) | -           | -            | 231<br>(132) | 259<br>(116) | 247<br>(248) |
| Maize           | 861<br>(83)   | 837<br>(220) | 965<br>(133)  | 673<br>(100) | -           | -            | 903<br>(163) | 551<br>(70)  | 825<br>(233) |
| Ragi            | 456<br>(20)   | 601<br>(74)  | 753<br>(78)   | 400<br>(16)  | -           | -            | 830<br>(53)  | 509<br>(41)  | 706<br>(94)  |

NET

|                 |               |              |               |              |             |              |              |              |              |
|-----------------|---------------|--------------|---------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Rice            | 1157<br>(139) | 825<br>(304) | 1007<br>(219) | 867<br>(224) | 982<br>(60) | 938<br>(383) | 937<br>(426) | 567<br>(17)  | 931<br>(443) |
| Kharif<br>Jowar | -             | -            | 788<br>(39)   | 327<br>(180) | -           | -            | 294<br>(72)  | 405<br>(147) | 374<br>(219) |
| Bajra           | -             | -            | 701<br>(47)   | 257<br>(201) | -           | -            | 231<br>(132) | 372<br>(116) | 300<br>(248) |
| Maize           | 955<br>(13)   | 914<br>(220) | 1062<br>(133) | 723<br>(100) | -           | -            | 903<br>(163) | 829<br>(70)  | 901<br>(233) |
| Ragi            | 456<br>(20)   | 670<br>(74)  | 813<br>(73)   | 460<br>(16)  | -           | -            | 830<br>(53)  | 607<br>(41)  | 749<br>(94)  |

RABI

GROSS

|               |              |              |              |              |             |              |              |              |              |
|---------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Wheat         | 823<br>(179) | 373<br>(247) | 686<br>(165) | 482<br>(261) | 931<br>(88) | 465<br>(338) | 624<br>(277) | 432<br>(149) | 557<br>(426) |
| Barley        | 799<br>(111) | 289<br>(112) | 895<br>(90)  | 302<br>(133) | -           | -            | 700<br>(113) | 488<br>(110) | 620<br>(223) |
| Rabi<br>Jowar | -            | -            | 614<br>(40)  | 304<br>(85)  | -           | -            | 376<br>(65)  | 347<br>(60)  | 366<br>(125) |

NET

|               |              |              |              |              |             |              |              |              |              |
|---------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Wheat         | 895<br>(179) | 456<br>(247) | 733<br>(165) | 575<br>(261) | 994<br>(88) | 538<br>(338) | 624<br>(277) | 637<br>(149) | 633<br>(426) |
| Barley        | 911<br>(111) | 425<br>(112) | 1033<br>(90) | 401<br>(133) | -           | -            | 700<br>(113) | 717<br>(110) | 731<br>(223) |
| Rabi<br>Jowar | -            | -            | 727<br>(40)  | 330<br>(85)  | -           | -            | 376<br>(65)  | 441<br>(60)  | 410<br>(125) |

Note:- Figures in brackets give the number of experiments.

13.2 It may be seen from the table above that the results have not been presented for all the crops under each category. The reason for this is that adequate number of observations for each of the two sub-categories were not available in such cases. For instance, crops like jowar and bajra are mostly raised under un-irrigated conditions. Further, very few fields for all the crops, except rice and wheat, were observed to have been sown with improved seed. Before discussing the results, it may be pointed out that any differential effect seen with a particular classification is not necessarily the net effect of the factor entering into that classification but should rather be regarded as the combined effect of that and other possible factors as well.

13.3 Irrigated Vs. Un-irrigated: It may be seen that the yield rate obtained from irrigated fields was higher than the yield rate from the un-irrigated fields by about 500 lbs./acre for wheat and barley; and 300 lbs. for rice. For maize, yield rate from the two types of fields was of the same order whereas for ragi it was more from the un-irrigated fields which was rather an un-expected result.

13.4 Manured Vs. Not manured: The term "manure" here covers all fields where any of the manures, namely, farmyard manure, fertilizers, compost, oilcakes or others were applied. For each crop, the yield rate obtained from the manured fields was considerably higher than the yield rate from the fields which were not manured.

13.5 Improved seed Vs. Local seed: The yield rate from the fields sown with improved seed was more than the yield rate from the fields sown with local seed by about 50 lbs/acre for rice and by about 450 lbs./acre for wheat.

**13.6 Crops sown pure Vs. Crops sown in mixture:** The gross yield rates from the mixed sown fields are expected to be lower than the gross yield rates from the pure fields. This was observed to be so for all the crops, except bajra. The net yield rates from the mixed fields (calculated by raising the gross yield in inverse proportion of the extent of that crop in the mixture) were observed to be of the same order as yield rates from pure fields for wheat and barley. The former was lower than the latter for rice, maize and ragi and higher for Kharif jowar, bajra and Rabi jowar.

#### 14. Conclusions

14.1 This random central spot check has shown that the differences between the State series and the Central supervision results were small for rice, bajra, maize, wheat and Rabi jowar. The differences for the Kharif jowar, ragi and barley were somewhat high. The differences were statistically not significant for any crop except Kharif jowar.

14.2 The percentage standard error of the yield rates based on the sample check data was, at all India level i.e. for the States covered, 4 per cent for rice; 5 per cent for maize and wheat; 9 to 11 per cent for Kharif jowar, bajra, ragi and barley; and 15 per cent for Rabi jowar. For all the food crops and States put together, the combined yield rate was estimated with standard error of the order of 3 per cent.

Table 1(a) Number of experiments planned, inspected, substituted and central driage experiments, Kharif 1963-64.

| State           | P A D D Y    |                |                      |        |                |                      | J O W A R    |                |                      |       |                |                      | B A J R A    |                |                      |       |                |                      |
|-----------------|--------------|----------------|----------------------|--------|----------------|----------------------|--------------|----------------|----------------------|-------|----------------|----------------------|--------------|----------------|----------------------|-------|----------------|----------------------|
|                 | No. of expts |                | No. of substitutions |        |                | No. of cent-         | No. of expts |                | No. of substitutions |       |                | No. of cen-          | No. of expts |                | No. of substitutions |       |                | No. of cen-          |
|                 | Pla-<br>nned | Ins-<br>pected | Vill-<br>age         | Expts. | Total<br>Expts | ral driage<br>expts. | Pla-<br>nned | Ins-<br>pected | Vill-<br>age         | Expts | Total<br>Expts | ral driage<br>expts. | Pla-<br>nned | Ins-<br>pected | Vill-<br>age         | Expts | Total<br>Expts | ral driage<br>expts. |
| 1               | 2            | 3              | 4                    | 5      | 6              | 7                    | 8            | 9              | 10                   | 11    | 12             | 13                   | 14           | 15             | 16                   | 17    | 18             | 19                   |
| Andhra Pradesh  | 30           | 28             | -                    | -      | -              | 10                   | 30           | 28             | -                    | -     | -              | 18                   | 20           | 18             | -                    | 1     | 1              | 11                   |
| Assam           | 50           | 38             | -                    | -      | -              | 12                   | -            | -              | -                    | -     | -              | -                    | -            | -              | -                    | -     | -              | -                    |
| Bihar           | 108          | 106            | 6                    | 20     | 32             | 10                   | -            | -              | -                    | -     | -              | -                    | -            | -              | -                    | -     | -              | -                    |
| Gujerat         | 20           | 18             | -                    | -      | -              | 18                   | 20           | 14             | -                    | 1     | 1              | 11                   | 40           | 38             | 1                    | 2     | 4              | 24                   |
| Jammu & Kashmir | -            | -              | -                    | -      | -              | -                    | -            | -              | -                    | -     | -              | -                    | -            | -              | -                    | -     | -              | -                    |
| Kerala          | 55           | 52             | -                    | 2      | 22             | -                    | -            | -              | -                    | -     | -              | -                    | -            | -              | -                    | -     | -              | -                    |
| Madhya Pradesh  | 24           | 19             | -                    | -      | -              | 14                   | 36           | 33             | -                    | -     | -              | 21                   | -            | -              | -                    | -     | -              | -                    |
| Madras          | 24           | 24             | -                    | 2      | 2              | 20                   | 20           | 19             | -                    | -     | -              | 11                   | 20           | 20             | -                    | 2     | 2              | 12                   |
| maharashtra     | 30           | 30             | -                    | 2      | 2              | 19                   | 60           | 57             | -                    | 5     | 5              | 28                   | 50           | 50             | 1                    | 3     | 5              | 24                   |
| Mysore          | 24           | 24             | -                    | 2      | 2              | 20                   | 36           | 27             | -                    | 2     | 2              | 19                   | -            | -              | -                    | -     | -              | -                    |
| Orissa          | 60           | 35             | -                    | 2      | 2              | 31                   | -            | -              | -                    | -     | -              | -                    | -            | -              | -                    | -     | -              | -                    |
| Punjab          | 30           | 30             | -                    | -      | -              | 22                   | -            | -              | -                    | -     | -              | -                    | 44           | 44             | -                    | -     | -              | 24                   |
| Rajasthan       | -            | -              | -                    | -      | -              | -                    | 20           | 18             | -                    | -     | -              | 11                   | 50           | 50             | -                    | -     | -              | 27                   |
| Uttar Pradesh   | 40           | 39             | -                    | 4      | 4              | 17                   | 30           | 23             | -                    | 2     | 2              | 12                   | 30           | 28             | -                    | 2     | 2              | 19                   |
| States covered  | 495          | 443            | 6                    | 34     | 46             | -                    | 252          | 219            | -                    | 10    | 10             | -                    | 254          | 243            | 2                    | 10    | 14             | -                    |

Table 1(a) (Contd.)

Number of experiments planned, inspected, substituted and central driage experiments - Kharif 1963-64.

| State          | M A I Z E     |           |                      |        |              |                              | R A G I       |           |                      |        |              |                              |
|----------------|---------------|-----------|----------------------|--------|--------------|------------------------------|---------------|-----------|----------------------|--------|--------------|------------------------------|
|                | no. of expts. |           | no. of substitutions |        |              | No. of Central driage expts. | No. of expts. |           | No. of substitutions |        |              | No. of central driage expts. |
|                | Planned       | Inspected | Village              | Expts. | Total expts. |                              | Planned       | Inspected | Village              | Expts. | Total expts. |                              |
| 1              | 2             | 3         | 4                    | 5      | 6            | 7                            | 8             | 9         | 10                   | 11     | 12           |                              |
| Andhra Pradesh | -             | -         | -                    | -      | -            | -                            | 30            | 28        | -                    | 3      | 3            | 20                           |
| Bihar          | -             | -         | -                    | -      | -            | -                            | -             | -         | -                    | -      | -            | -                            |
| Madhya Pradesh | 50            | 48        | 3                    | 8      | 14           | 20                           | -             | -         | -                    | -      | -            | -                            |
| Madras         | 20            | 19        | -                    | -      | -            | 14                           | -             | -         | -                    | -      | -            | -                            |
| Uttar Pradesh  | 20            | 13        | -                    | -      | -            | 12                           | -             | -         | -                    | -      | -            | -                            |
| West Bengal    | -             | -         | -                    | -      | -            | -                            | -             | -         | -                    | -      | -            | -                            |
| Assam          | 40            | 36        | -                    | -      | -            | 23                           | -             | -         | -                    | -      | -            | -                            |
| Goa            | -             | -         | -                    | -      | -            | -                            | 20            | 20        | -                    | 1      | 1            | 17                           |
| Karnataka      | -             | -         | -                    | -      | -            | -                            | -             | -         | -                    | -      | -            | -                            |
| Kerala         | -             | -         | -                    | -      | -            | -                            | 50            | 46        | -                    | 11     | 11           | 33                           |
| Madhya Pradesh | -             | -         | -                    | -      | -            | -                            | -             | -         | -                    | -      | -            | -                            |
| Punjab         | 44            | 42        | -                    | -      | -            | 33                           | -             | -         | -                    | -      | -            | -                            |
| Rajasthan      | 40            | 34        | -                    | -      | -            | 21                           | -             | -         | -                    | -      | -            | -                            |
| Uttar Pradesh  | 60            | 41        | -                    | 3      | 3            | 14                           | -             | -         | -                    | -      | -            | -                            |
| Totals covered | 274           | 233       | 3                    | 11     | 17           | -                            | 100           | 94        | -                    | 15     | 15           | -                            |

Table 1(b)

No. of experiments planned, inspected and substituted, and Central bridge experiments - Jabi 1982-84

| State           | M. N. S. A. T         |           |                      |       |                              |                  | B. A. S. L. E. Y.     |           |                      |       |                              |                  | R. A. B. I. J. O. W. A. R. |           |                      |       |                       |         |           |           |       |             |  |
|-----------------|-----------------------|-----------|----------------------|-------|------------------------------|------------------|-----------------------|-----------|----------------------|-------|------------------------------|------------------|----------------------------|-----------|----------------------|-------|-----------------------|---------|-----------|-----------|-------|-------------|--|
|                 | No. of expts. planned |           | No. of substitutions |       | No. of Central bridge expts. |                  | No. of expts. planned |           | No. of substitutions |       | No. of Central bridge expts. |                  | No. of expts. planned      |           | No. of substitutions |       | No. of expts. planned |         |           |           |       |             |  |
|                 | Planned               | Inspected | Will- age            | Expts | Total Expts                  | al bridge expts. | Planned               | Inspected | Will- age            | Expts | Total Expts                  | al bridge expts. | Planned                    | Inspected | Will- age            | Expts | Total Expts           | Planned | Inspected | Will- age | Expts | Total Expts |  |
| 1               | 2                     | 3         | 4                    | 5     | 6                            | 7                | 8                     | 9         | 10                   | 11    | 12                           | 13               | 14                         | 15        | 16                   | 17    | 18                    | 19      |           |           |       |             |  |
| Uttara Pradesh  | -                     | -         | -                    | -     | -                            | -                | -                     | -         | -                    | -     | -                            | -                | 50                         | 44        | 2                    | -     | 4                     | 35      |           |           |       |             |  |
| Bihar           | 50                    | 50        | 2                    | 7     | 11                           | 14               | 40                    | 40        | 3                    | 8     | 14                           | 20               | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Uttar Pradesh   | 50                    | 46        | -                    | 4     | 4                            | 20               | -                     | -         | -                    | -     | -                            | -                | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Jammu & Kashmir | 20                    | 20        | -                    | -     | -                            | 18               | -                     | -         | -                    | -     | -                            | -                | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Uttar Pradesh   | 60                    | 53        | -                    | -     | -                            | 13               | 21                    | 19        | -                    | -     | -                            | 16               | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Maharashtra     | 40                    | 37        | -                    | 2     | 2                            | 19               | -                     | -         | -                    | -     | -                            | -                | 50                         | 43        | -                    | 3     | 3                     | 39      |           |           |       |             |  |
| Uttar Pradesh   | 20                    | 18        | -                    | 1     | 1                            | -                | -                     | -         | -                    | -     | -                            | -                | 10                         | 38        | 1                    | 5     | 7                     | 23      |           |           |       |             |  |
| Uttar Pradesh   | 70                    | 67        | -                    | 3     | 3                            | 19               | 50                    | 49        | -                    | 1     | 1                            | 41               | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Uttar Pradesh   | 50                    | 49        | -                    | -     | -                            | 20               | 50                    | 47        | -                    | -     | -                            | 43               | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| Uttar Pradesh   | 90                    | 86        | -                    | 3     | 3                            | 19               | 70                    | 68        | -                    | 5     | 5                            | 49               | -                          | -         | -                    | -     | -                     | -       |           |           |       |             |  |
| States covered  | 150                   | 129       | 2                    | 20    | 24                           | -                | 234                   | 223       | 3                    | 14    | 20                           | -                | 140                        | 125       | 3                    | 8     | 14                    | -       |           |           |       |             |  |



Table 2.1(a) Classification analysis - Gross yield water (in lbs/acre) of dried grain by States and categories, Kharif, 1963-64.

| State          | Kharif J O M A R |           |               |              |               |           |               |           |               |              |           | Total    |              |           |
|----------------|------------------|-----------|---------------|--------------|---------------|-----------|---------------|-----------|---------------|--------------|-----------|----------|--------------|-----------|
|                | Category - 1     |           |               | Category - 2 |               |           | Category - 3  |           |               | Category - 4 |           |          | Category - 5 |           |
|                | Un-irrigated     | Manu-ured | Not-manu-ured | Manu-ured    | Not-manu-ured | Manu-ured | Not-manu-ured | Manu-ured | Not-manu-ured | Pure         | Mixed     |          | Pure         | Mixed     |
| 2              | 3                | 4         | 5             | 6            | 7             | 8         | 9             | 10        | 11            | 12           | 13        | 14       | 15           |           |
| Uttar Pradesh  | 1336 (27)        | 1289 (1)  | 1311 (25)     | 1543 (3)     | 1517 (18)     | 1501 (10) | 1337 (23)     | -         | 1337 (28)     | 617 (9)      | 126 (1)   | 236 (9)  | 283 (19)     | 281 (28)  |
| Assam          | -                | 983 (38)  | -             | 983 (35)     | -             | 983 (38)  | 1014 (30)     | 424 (2)   | 983 (38)      | -            | -         | -        | -            | -         |
| Bihar          | 1044 (11)        | 630 (92)  | 1022 (20)     | 828 (65)     | 504 (1)       | 871 (105) | 656 (105)     | 175 (1)   | 864 (106)     | -            | -         | -        | -            | -         |
| Madhya Pradesh | 502 (1)          | 723 (17)  | 942 (10)      | 123 (8)      | 1000 (2)      | 875 (16)  | 977 (11)      | 295 (7)   | 711 (18)      | 803 (1)      | 99 (13)   | 98 (11)  | 335 (3)      | 149 (11)  |
| Uttar Pradesh  | 1535 (18)        | 1170 (34) | 1162 (52)     | -            | 1317 (16)     | 1249 (35) | 1162 (52)     | -         | 1162 (52)     | -            | -         | -        | -            | -         |
| Madhya Pradesh | 1442 (2)         | 581 (17)  | 768 (5)       | 637 (14)     | 347 (1)       | 690 (16)  | 681 (18)      | 489 (1)   | 672 (19)      | -            | 302 (33)  | 373 (4)  | 292 (29)     | 302 (33)  |
| Madhya Pradesh | 1285 (23)        | 743 (1)   | 1260 (24)     | -            | 1687 (4)      | 1225 (20) | 1284 (22)     | 1054 (2)  | 1250 (21)     | 658 (13)     | 271 (6)   | 594 (17) | 00 (2)       | 519 (19)  |
| Madhya Pradesh | 909 (3)          | 781 (27)  | 991 (11)      | 680 (19)     | -             | 792 (30)  | 829 (28)      | 303 (2)   | 794 (30)      | 584 (4)      | 309 (33)  | 344 (10) | 325 (37)     | 328 (57)  |
| Madhya Pradesh | 1355 (17)        | 770 (7)   | 1213 (24)     | -            | 1928 (8)      | 855 (16)  | 1213 (24)     | -         | 1213 (24)     | 141 (11)     | 269 (16)  | 192 (4)  | 365 (23)     | 339 (27)  |
| Uttar Pradesh  | 1131 (7)         | 905 (26)  | 902 (23)      | 959 (12)     | -             | 953 (35)  | 903 (33)      | 460 (2)   | 903 (35)      | -            | -         | -        | -            | -         |
| Uttar Pradesh  | 695 (18)         | 679 (12)  | 666 (16)      | 693 (14)     | 933 (6)       | 600 (22)  | 689 (30)      | -         | 689 (30)      | -            | -         | -        | -            | -         |
| Uttar Pradesh  | -                | -         | -             | -            | -             | -         | -             | -         | -             | -            | 166 (18)  | 225 (11) | 74 (7)       | 166 (18)  |
| Uttar Pradesh  | 683 (9)          | 601 (30)  | 628 (9)       | 618 (30)     | 1173 (2)      | 629 (37)  | 667 (39)      | -         | 667 (39)      | 404 (1)      | 305 (22)  | 307 (6)  | 310 (17)     | 310 (23)  |
| States covered | 1153 (139)       | 823 (301) | 1000 (219)    | 644 (224)    | 982 (60)      | 932 (283) | 937 (420)     | 152 (17)  | 995 (413)     | 545 (39)     | 256 (150) | 294 (72) | 254 (147)    | 290 (219) |

| M A I Z E    |                 |              |             |              | R A G I        |                  |              |                 |              |             |             |  |
|--------------|-----------------|--------------|-------------|--------------|----------------|------------------|--------------|-----------------|--------------|-------------|-------------|--|
| Category-2   |                 | Category-1   |             | Combi        | Category-1     |                  | Category-2   |                 | Category-1   |             | Combi       |  |
| Manur-<br>ed | Not-<br>manured | Pure         | Mixed       |              | Irri-<br>gated | Unir-<br>rigated | manur-<br>ed | Not-<br>manured | Pure         | Mixed       |             |  |
| 23           | 24              | 25           | 26          | 27           | 28             | 29               | 30           | 31              | 32           | 33          | 34          |  |
| -            | -               | -            | -           | -            | 713<br>(9)     | 541<br>(19)      | 708<br>(20)  | 318<br>(8)      | 612<br>(27)  | 152<br>(1)  | 596<br>(28) |  |
| 1244<br>(18) | 981<br>(30)     | 1174<br>(36) | 795<br>(12) | 1079<br>(18) | -              | -                | -            | -               | -            | -           | -           |  |
| 754<br>(7)   | 318<br>(12)     | 279<br>(13)  | 516<br>(16) | 478<br>(19)  | -              | -                | -            | -               | -            | -           | -           |  |
| 1433<br>(7)  | 419<br>(6)      | 995<br>(12)  | 609<br>(1)  | 965<br>(13)  | -              | -                | -            | -               | -            | -           | -           |  |
| 1203<br>(16) | 436<br>(20)     | 1129<br>(19) | 383<br>(17) | 777<br>(36)  | 1523<br>(10)   | 549<br>(10)      | 953<br>(20)  | -               | 1523<br>(10) | 519<br>(10) | 919<br>(20) |  |
| -            | -               | -            | -           | -            | -              | -                | -            | -               | -            | -           | -           |  |
| -            | -               | -            | -           | -            | 0<br>(1)       | 638<br>(15)      | 666<br>(38)  | 426<br>(8)      | 656<br>(16)  | 608<br>(30) | 625<br>(16) |  |
| 1233<br>(33) | 707<br>(9)      | 1250<br>(35) | 471<br>(7)  | 1120<br>(12) | -              | -                | -            | -               | -            | -           | -           |  |
| 731<br>(19)  | 719<br>(15)     | 772<br>(30)  | 383<br>(4)  | 726<br>(34)  | -              | -                | -            | -               | -            | -           | -           |  |
| 586<br>(33)  | 626<br>(8)      | 599<br>(28)  | 585<br>(13) | 594<br>(41)  | -              | -                | -            | -               | -            | -           | -           |  |
| 965<br>(133) | 673<br>(100)    | 903<br>(163) | 551<br>(70) | 825<br>(233) | 456<br>(20)    | 601<br>(74)      | 753<br>(78)  | 400<br>(16)     | 830<br>(53)  | 509<br>(41) | 705<br>(91) |  |

Table 2.1(-) (contd)

| State           | B               |               |              |              |              |             | A            |       | Category-1 |                 |
|-----------------|-----------------|---------------|--------------|--------------|--------------|-------------|--------------|-------|------------|-----------------|
|                 | Category-2      |               | Category-1   |              | Combined     | Irrigated   | Un-irrigated | Total | Total      |                 |
|                 | Canal-irrigated | Not-irrigated | Pure         | Mixed        |              |             |              |       |            | Canal-irrigated |
| 1               | 17              | 18            | 19           | 20           | 21           | 22          | 23           | 24    |            |                 |
| Andhra Pradesh  | 360<br>(6)      | 199<br>(12)   | 378<br>(5)   | 165<br>(10)  | 259<br>(18)  | -           | -            | -     | -          |                 |
| Bihar           | -               | -             | -            | -            | -            | -           | 1079<br>(18) | -     | -          |                 |
| Gujarat         | 506<br>(13)     | 314<br>(25)   | 357<br>(27)  | 135<br>(11)  | 380<br>(38)  | 737<br>(1)  | 101<br>(18)  | -     | -          |                 |
| Jammu & Kashmir | -               | -             | -            | -            | -            | 536<br>(3)  | 1094<br>(10) | -     | -          |                 |
| Madhya Pradesh  | -               | -             | -            | -            | -            | -           | 777<br>(36)  | -     | -          |                 |
| Madras          | 478<br>(12)     | 259<br>(8)    | 367<br>(16)  | 339<br>(4)   | 379<br>(20)  | -           | -            | -     | -          |                 |
| Maharashtra     | 185<br>(4)      | 163<br>(46)   | 159<br>(8)   | 195<br>(42)  | 190<br>(50)  | -           | -            | -     | -          |                 |
| Mysore          | -               | -             | -            | -            | -            | -           | -            | -     | -          |                 |
| Punjab          | 587<br>(9)      | 303<br>(35)   | 301<br>(30)  | 360<br>(14)  | 361<br>(14)  | 803<br>(7)  | 1143<br>(35) | -     | -          |                 |
| Rajasthan       | 728<br>(1)      | 124<br>(49)   | 133<br>(32)  | 143<br>(10)  | 130<br>(50)  | 1067<br>(2) | 704<br>(32)  | -     | -          |                 |
| Uttar Pradesh   | 601<br>(2)      | 420<br>(26)   | 321<br>(11)  | 528<br>(17)  | 46<br>(28)   | -           | 594<br>(41)  | -     | -          |                 |
| States covered  | 623<br>(47)     | 212<br>(201)  | 231<br>(134) | 259<br>(115) | 247<br>(240) | 601<br>(78) | 837<br>(220) | -     | -          |                 |

| State           | W M S A T    |              |                     |              |               |               | B C L R Y     |              |              |              |                     |              | R - J O W A R |               |              |             |             |               |              |              |
|-----------------|--------------|--------------|---------------------|--------------|---------------|---------------|---------------|--------------|--------------|--------------|---------------------|--------------|---------------|---------------|--------------|-------------|-------------|---------------|--------------|--------------|
|                 | Category-1   |              | Category-2          |              | Category-3    |               | Category-4    |              | Category-1   |              | Category-2          |              | Category-1    |               | Category-2   |             | Category-4  |               |              |              |
|                 | Un-<br>ligat | Manu<br>rel  | Sub-<br>manu<br>rel | Improv<br>se | Local<br>supp | Pure<br>Mixed | Pure<br>Mixed | Comb<br>ined | Un-<br>ligat | Manu<br>rel  | Sub-<br>manu<br>rel | Manu<br>rel  | Pure<br>Mixed | Pure<br>Mixed | Comb<br>ined | Manu<br>rel | Manu<br>rel | Pure<br>Mixed | Comb<br>ined |              |
|                 | 3            | 4            | 5                   | 6            | 7             | 8             | 9             | 10           | 11           | 12           | 13                  | 14           | 15            | 16            | 17           | 18          | 19          | 20            | 21           | 22           |
| Andhra Pradesh  | -            | -            | -                   | -            | -             | -             | -             | -            | -            | -            | -                   | -            | -             | -             | 128<br>(17)  | 200<br>(27) | 188<br>(28) | 145<br>(16)   | -            | 172<br>(11)  |
| Bihar           | 248<br>(31)  | 607<br>(8)   | 258<br>(12)         | -            | 323<br>(50)   | 378<br>(20)   | 285<br>(30)   | 323<br>(50)  | 401<br>(5)   | 220<br>(35)  | 398<br>(7)          | 289<br>(33)  | 358<br>(13)   | 285<br>(27)   | 309<br>(40)  | -           | -           | -             | -            |              |
| Gujarat         | 400<br>(12)  | 709<br>(26)  | 576<br>(18)         | -            | 695<br>(16)   | 701<br>(15)   | 412<br>(1)    | 695<br>(40)  | -            | -            | -                   | -            | -             | -             | -            | -           | -           | -             | -            |              |
| Jammu & Kashmir | 121<br>(10)  | 400<br>(10)  | 151<br>(10)         | -            | 127<br>(20)   | 388<br>(15)   | 515<br>(5)    | 127<br>(20)  | -            | -            | -                   | -            | -             | -             | -            | -           | -           | -             | -            |              |
| Karnataka       | 120<br>(53)  | 510<br>(9)   | 409<br>(41)         | 105<br>(2)   | 397<br>(51)   | 472<br>(37)   | 320<br>(10)   | 420<br>(58)  | 715<br>(6)   | 111<br>(13)  | 1051<br>(1)         | 129<br>(15)  | 101<br>(3)    | 301<br>(10)   | 322<br>(19)  | -           | -           | -             | -            |              |
| Kerala          | 352<br>(26)  | 860<br>(12)  | 328<br>(25)         | 898<br>(1)   | 52<br>(33)    | 555<br>(29)   | 303<br>(8)    | 501<br>(37)  | -            | -            | -                   | -            | -             | -             | -            | 846<br>(7)  | 383<br>(36) | 486<br>(24)   | 121<br>(19)  |              |
| Madhya Pradesh  | 226<br>(14)  | 350<br>(10)  | 228<br>(8)          | -            | 295<br>(18)   | 502<br>(6)    | 193<br>(12)   | 295<br>(18)  | -            | -            | -                   | -            | -             | -             | -            | 297<br>(16) | 195<br>(22) | 249<br>(13)   | 297<br>(25)  |              |
| Maharashtra     | 1244<br>(30) | 998<br>(30)  | 827<br>(37)         | 1000<br>(12) | 641<br>(25)   | 1069<br>(12)  | 632<br>(25)   | 903<br>(67)  | 681<br>(16)  | 164<br>(33)  | 873<br>(7)          | 478<br>(42)  | 756<br>(28)   | 210<br>(21)   | 534<br>(19)  | -           | -           | -             | -            |              |
| Madhya Pradesh  | 236<br>(19)  | 641<br>(23)  | 361<br>(26)         | -            | 493<br>(49)   | 539<br>(32)   | 406<br>(17)   | 493<br>(49)  | 1066<br>(41) | 207<br>(6)   | 1170<br>(37)        | 119<br>(10)  | 1151<br>(30)  | 631<br>(17)   | 963<br>(47)  | -           | -           | -             | -            |              |
| Uttar Pradesh   | 324<br>(39)  | 667<br>(35)  | 457<br>(51)         | 684<br>(40)  | 131<br>(46)   | 591<br>(51)   | 486<br>(30)   | 510<br>(86)  | 840<br>(13)  | 294<br>(25)  | 910<br>(35)         | 344<br>(33)  | 710<br>(39)   | 534<br>(29)   | 639<br>(68)  | -           | -           | -             | -            |              |
| Total:-         | 823<br>(179) | 686<br>(105) | 482<br>(261)        | 931<br>(60)  | 465<br>(338)  | 624<br>(27)   | 432<br>(149)  | 557<br>(426) | 799<br>(111) | 289<br>(112) | 895<br>(90)         | 302<br>(133) | 700<br>(113)  | 486<br>(110)  | 620<br>(223) | 514<br>(60) | 304<br>(85) | 376<br>(65)   | 347<br>(60)  | 366<br>(125) |

Figures in brackets indicate the number of experiments.

TABLE 2.2(a) (contd.)

| State           | B A J R A    |                 |              |              |              | M A I Z E      |                  |               |                 |              |              |              | R A G I        |                  |             |                 |              |             |              |
|-----------------|--------------|-----------------|--------------|--------------|--------------|----------------|------------------|---------------|-----------------|--------------|--------------|--------------|----------------|------------------|-------------|-----------------|--------------|-------------|--------------|
|                 | Category - 2 |                 | Category-1   |              |              | Category-1     |                  | Category-2    |                 | Category-4   |              |              | Category-1     |                  | Category-2  |                 | Category-4   |             |              |
|                 | manur-<br>ed | Not-man<br>ured | Pure         | mixe<br>d    | Combi<br>ned | Irri-<br>gated | Un-irr<br>igated | manu<br>red   | Not-manu<br>red | Puro         | Mixed        | Combi<br>ned | Irri-<br>gated | Un-irr<br>igated | Manu<br>red | Not-manu<br>red | Pure         | mixed       | Combi<br>ned |
| 1               | 16           | 17              | 18           | 19           | 20           | 21             | 22               | 23            | 24              | 25           | 26           | 27           | 28             | 29               | 30          | 31              | 32           | 33          | 34           |
| Andhra Pradesh  | 743<br>(6)   | 211<br>(12)     | 378<br>(8)   | 397<br>(10)  | 388<br>(18)  | -              | -                | -             | -               | -            | -            | -            | 713<br>(9)     | 542<br>(19)      | 709<br>(20) | 318<br>(8)      | 613<br>(27)  | 169<br>(1)  | 597<br>(26)  |
| Bihar           | -            | -               | -            | -            | -            | -              | 1134<br>(48)     | 1264<br>(18)  | 1057<br>(30)    | 1174<br>(36) | 1015<br>(12) | 1134<br>(48) | -              | -                | -           | -               | -            | -           | -            |
| Gujarat         | 511<br>(13)  | 339<br>(65)     | 357<br>(27)  | 497<br>(11)  | 398<br>(36)  | 1474<br>(1)    | 782<br>(18)      | 1418<br>(7)   | 470<br>(12)     | 279<br>(3)   | 920<br>(16)  | 819<br>(19)  | -              | -                | -           | -               | -            | -           | -            |
| Jammu & Kashmir | -            | -               | -            | -            | -            | 526<br>(3)     | 1114<br>(10)     | 1433<br>(7)   | 453<br>(6)      | 995<br>(12)  | 810<br>(1)   | 981<br>(13)  | -              | -                | -           | -               | -            | -           | -            |
| Madhya Pradesh  | -            | -               | -            | -            | -            | -              | 930<br>(36)      | 1391<br>(16)  | 562<br>(20)     | 1129<br>(19) | 708<br>(17)  | 930<br>(36)  | -              | -                | -           | -               | -            | -           | -            |
| Madras          | 503<br>(12)  | 263<br>(8)      | 367<br>(16)  | 373<br>(4)   | 389<br>(20)  | -              | -                | -             | -               | -            | -            | -            | 1523<br>(10)   | 619<br>(10)      | 992<br>(20) | -               | 1523<br>(10) | 619<br>(10) | 993<br>(20)  |
| Maharashtra     | 531<br>(4)   | 186<br>(46)     | 159<br>(8)   | 223<br>(42)  | 213<br>(50)  | -              | -                | -             | -               | -            | -            | -            | -              | -                | -           | -               | -            | -           | -            |
| Mysore          | -            | -               | -            | -            | -            | -              | -                | -             | -               | -            | -            | -            | 00<br>(1)      | 728<br>(45)      | 756<br>(38) | 505<br>(8)      | 656<br>(16)  | 742<br>(30) | 713<br>(46)  |
| Punjab          | 661<br>(9)   | 333<br>(35)     | 361<br>(30)  | 466<br>(14)  | 400<br>(14)  | 803<br>(7)     | 1214<br>(35)     | 1262<br>(33)  | 717<br>(9)      | 1250<br>(35) | 623<br>(7)   | 1145<br>(42) | -              | -                | -           | -               | -            | -           | -            |
| Rajasthan       | 728<br>(1)   | 157<br>(49)     | 133<br>(32)  | 234<br>(18)  | 169<br>(50)  | 1067<br>(2)    | 778<br>(32)      | 825<br>(19)   | 756<br>(15)     | 772<br>(30)  | 968<br>(4)   | 794<br>(34)  | -              | -                | -           | -               | -            | -           | -            |
| Uttar Pradesh   | 1194<br>(2)  | 620<br>(26)     | 321<br>(11)  | 862<br>(17)  | 661<br>(28)  | -              | 645<br>(41)      | 647<br>(33)   | 636<br>(8)      | 599<br>(28)  | 747<br>(13)  | 645<br>(41)  | -              | -                | -           | -               | -            | -           | -            |
| States covered: | 701<br>(47)  | 257<br>(201)    | 231<br>(132) | 372<br>(116) | 306<br>(248) | 955<br>(13)    | 914<br>(220)     | 1062<br>(133) | 723<br>(100)    | 903<br>(163) | 829<br>(70)  | 901<br>(232) | 456<br>(20)    | 670<br>(74)      | 813<br>(78) | 460<br>(16)     | 830<br>(53)  | 607<br>(41) | 749<br>(94)  |

Table 2.2(a)

Classificatory analysis - Net yield rates (in lbs/acr) of dried grain  
by states and categories, Kharif, 1963-64.

| State           | h. I o w s F   |                   |               |                       |                  |               |              |             |               |               |                       |              |              |               |
|-----------------|----------------|-------------------|---------------|-----------------------|------------------|---------------|--------------|-------------|---------------|---------------|-----------------------|--------------|--------------|---------------|
|                 | Category - 1   |                   | Category - 2  |                       | Category - 3     |               | Category - 4 |             | Combi-<br>ned | Category - 2  |                       | Category - 3 |              | Comb-<br>ined |
|                 | Irr-ge-<br>ted | Un-irri-<br>gated | Meas-<br>ured | Not-<br>meas-<br>ured | Improved<br>seed | Local<br>seed | Pure         | Mixed       |               | Meas-<br>ured | Not-<br>meas-<br>ured | Pure         | Mixed        |               |
| 1               | 2              | 3                 | 4             | 5                     | 6                | 7             | 8            | 9           | 10            | 11            | 12                    | 13           | 14           | 15            |
| Andhra Pradesh  | 1336<br>(27)   | 1280<br>(1)       | 1311<br>(25)  | 1452<br>(3)           | 1317<br>(18)     | 1501<br>(10)  | 1337<br>(28) | -           | 1337<br>(28)  | 681<br>(9)    | 265<br>(19)           | 286<br>(9)   | 452<br>(19)  | 399<br>(28)   |
| Assam           | -              | 901<br>(30)       | -             | 991<br>(38)           | -                | 991<br>(38)   | 1011<br>(25) | 547<br>(2)  | 991<br>(38)   | -             | -                     | -            | -            | -             |
| Bihar           | 1051<br>(14)   | 837<br>(92)       | 1024<br>(20)  | 834<br>(80)           | 561<br>(1)       | 871<br>(105)  | 866<br>(105) | 101<br>(1)  | 867<br>(106)  | -             | -                     | -            | -            | -             |
| Gujarat         | 502<br>(1)     | 764<br>(17)       | 984<br>(10)   | 456<br>(8)            | 1000<br>(2)      | 719<br>(16)   | 977<br>(11)  | 392<br>(7)  | 749<br>(18)   | 1607<br>(1)   | 100<br>(13)           | 98<br>(11)   | 610<br>(3)   | 208<br>(11)   |
| Kerala          | 1535<br>(18)   | 1170<br>(34)      | 1162<br>(52)  | -                     | 1317<br>(16)     | 1249<br>(36)  | 1162<br>(52) | -           | 1163<br>(52)  | -             | -                     | -            | -            | -             |
| Madhya Pradesh  | 1444<br>(2)    | 593<br>(17)       | 811<br>(5)    | 637<br>(14)           | 347<br>(1)       | 701<br>(18)   | 681<br>(18)  | 699<br>(1)  | 683<br>(19)   | -             | 393<br>(33)           | 373<br>(4)   | 396<br>(29)  | 393<br>(33)   |
| Madras          | 1318<br>(23)   | 743<br>(1)        | 1288<br>(24)  | -                     | 1687<br>(4)      | 1315<br>(20)  | 1284<br>(22) | 1355<br>(2) | 1289<br>(24)  | 659<br>(13)   | 271<br>(6)            | 594<br>(17)  | 00<br>(2)    | 519<br>(19)   |
| Maharashtra     | 909<br>(3)     | 781<br>(27)       | 991<br>(11)   | 681<br>(19)           | -                | 795<br>(30)   | 829<br>(28)  | 307<br>(2)  | 795<br>(30)   | 671<br>(4)    | 362<br>(53)           | 341<br>(10)  | 392<br>(17)  | 383<br>(57)   |
| Mysore          | 1395<br>(17)   | 770<br>(7)        | 1213<br>(24)  | -                     | 1928<br>(8)      | 855<br>(16)   | 1213<br>(24) | -           | 1213<br>(24)  | 525<br>(11)   | 495<br>(16)           | 192<br>(4)   | 562<br>(23)  | 501<br>(27)   |
| Orissa          | 1131<br>(7)    | 907<br>(20)       | 963<br>(23)   | 959<br>(12)           | -                | 964<br>(35)   | 963<br>(33)  | 545<br>(2)  | 964<br>(35)   | -             | -                     | -            | -            | -             |
| Punjab          | 695<br>(18)    | 673<br>(12)       | 686<br>(16)   | 693<br>(14)           | 933<br>(8)       | 600<br>(22)   | 689<br>(30)  | -           | 689<br>(30)   | -             | -                     | -            | -            | -             |
| Rajasthan       | -              | -                 | -             | -                     | -                | -             | -            | -           | -             | -             | 176<br>(18)           | 225<br>(11)  | 78<br>(7)    | 176<br>(18)   |
| Uttar Pradesh   | 883<br>(9)     | 601<br>(30)       | 828<br>(9)    | 618<br>(30)           | 1173<br>(2)      | 639<br>(37)   | 667<br>(39)  | -           | 667<br>(39)   | 696<br>(1)    | 463<br>(22)           | 307<br>(6)   | 531<br>(17)  | 473<br>(23)   |
| States covered: | 1157<br>(139)  | 825<br>(304)      | 1007<br>(219) | 867<br>(224)          | 982<br>(60)      | 938<br>(383)  | 937<br>(426) | 567<br>(17) | 931<br>(443)  | 788<br>(39)   | 327<br>(180)          | 294<br>(72)  | 405<br>(147) | 374<br>(219)  |

Table 2.2(c)

Classificatory analysis - net yield rates (in lbs/acre) of dried grain by States and categories, Rabi, 1963-64.

| State           | W H E A T   |         |       |             |       |            |       |            |        | B A R L E Y |            |      |       |            |       |            | J O W A R |      |            |      |            |      |      |
|-----------------|-------------|---------|-------|-------------|-------|------------|-------|------------|--------|-------------|------------|------|-------|------------|-------|------------|-----------|------|------------|------|------------|------|------|
|                 | Category -1 |         |       | Category -2 |       | Category-3 |       | Category-4 |        | Comb        | Category-1 |      |       | Category-2 |       | Category-4 |           | Comb | Category-2 |      | Category-4 |      | Comb |
|                 | Irriga      | Un-irri | Manu  | Not-        | Impro | Local      | Pure  | Mixed      | Irriga |             | Un-irri    | Manu | Not-  | Impro      | Local | Comb       | Manu      |      | Not-       | Pure | Mixed      | Comb |      |
| ted             | ted         | red     | red   | seed        | seed  | seed       | seed  | ined       | ted    | ted         | red        | red  | seed  | seed       | ined  | red        | red       | seed | seed       | ined | red        | red  | ined |
| 1               | 2           | 3       | 4     | 5           | 6     | 7          | 8     | 9          | 10     | 11          | 12         | 13   | 14    | 15         | 16    | 17         | 18        | 19   | 20         | 21   | 22         |      |      |
| Andhra Pradesh  | -           | -       | -     | -           | -     | -          | -     | -          | -      | -           | -          | -    | -     | -          | -     | -          | 151       | 235  | 188        | 229  | 203        |      |      |
|                 |             |         |       |             |       |            |       |            |        |             |            |      |       |            |       |            | (17)      | (27) | (28)       | (16) | (44)       |      |      |
| Lihar           | 528         | 407     | 723   | 402         | -     | 453        | 378   | 503        | 453    | 445         | 434        | 632  | 414   | 358        | 478   | 135        | -         | -    | -          | -    | -          |      |      |
|                 | (19)        | (31)    | (8)   | (42)        |       | (50)       | (20)  | (30)       | (50)   | (5)         | (35)       | (7)  | (33)  | (13)       | (27)  | (40)       |           |      |            |      |            |      |      |
| Gujarat         | 833         | 487     | 775   | 578         | -     | 698        | 701   | 550        | 698    | -           | -          | -    | -     | -          | -     | -          | -         | -    | -          | -    | -          |      |      |
|                 | (28)        | (18)    | (28)  | (18)        |       | (16)       | (45)  | (1)        | (40)   |             |            |      |       |            |       |            |           |      |            |      |            |      |      |
| Jammu & Kashmir | 439         | 446     | 415   | 474         | -     | 444        | 388   | 613        | 444    | -           | -          | -    | -     | -          | -     | -          | -         | -    | -          | -    | -          |      |      |
|                 | (4)         | (16)    | (10)  | (10)        |       | (20)       | (15)  | (5)        | (20)   |             |            |      |       |            |       |            |           |      |            |      |            |      |      |
| Madhya Pradesh  | -           | 483     | 510   | 477         | 1165  | 456        | 472   | 409        | 483    | 1422        | 322        | 1863 | 352   | 104        | 776   | 669        | -         | -    | -          | -    | -          |      |      |
|                 |             | (53)    | (9)   | (44)        | (2)   | (51)       | (37)  | (16)       | (53)   | (6)         | (13)       | (4)  | (15)  | (3)        | (16)  | (19)       |           |      |            |      |            |      |      |
| Maharashtra     | 870         | 355     | 863   | 338         | 898   | 461        | 555   | 339        | 508    | -           | -          | -    | -     | -          | -     | -          | 1000      | 113  | 486        | 537  | 508        |      |      |
|                 | (11)        | (26)    | (12)  | (25)        | (4)   | (33)       | (29)  | (8)        | (37)   |             |            |      |       |            |       |            | (7)       | (36) | (24)       | (19) | (43)       |      |      |
| Mysore          | 539         | 255     | 369   | 256         | -     | 319        | 502   | 227        | 319    | -           | -          | -    | -     | -          | -     | -          | 471       | 209  | 249        | 356  | 319        |      |      |
|                 | (1)         | (14)    | (10)  | (8)         |       | (18)       | (6)   | (12)       | (18)   |             |            |      |       |            |       |            | (10)      | (22) | (13)       | (25) | (38)       |      |      |
| Punjab          | 1333        | 655     | 1010  | 1020        | 1163  | 777        | 1069  | 934        | 1019   | 696         | 555        | 883  | 554   | 756        | 396   | 601        | -         | -    | -          | -    | -          |      |      |
|                 | (36)        | (31)    | (30)  | (37)        | (42)  | (25)       | (42)  | (25)       | (67)   | (16)        | (33)       | (7)  | (42)  | (28)       | (21)  | (19)       |           |      |            |      |            |      |      |
| Rajasthan       | 747         | 383     | 695   | 527         | -     | 606        | 539   | 731        | 606    | 1182        | 519        | 1326 | 251   | 1151       | 1008  | 1097       | -         | -    | -          | -    | -          |      |      |
|                 | (30)        | (19)    | (23)  | (20)        |       | (19)       | (32)  | (17)       | (49)   | (41)        | (6)        | (37) | (10)  | (30)       | (17)  | (47)       |           |      |            |      |            |      |      |
| Uttar Pradesh   | 819         | 391     | 704   | 529         | 757   | 483        | 591   | 673        | 624    | 906         | 395        | 986  | 433   | 718        | 717   | 717        | -         | -    | -          | -    | -          |      |      |
|                 | (17)        | (39)    | (30)  | (51)        | (40)  | (16)       | (51)  | (35)       | (86)   | (13)        | (25)       | (35) | (33)  | (39)       | (29)  | (68)       |           |      |            |      |            |      |      |
| Pooled:         | 895         | 450     | 733   | 575         | 994   | 538        | 624   | 637        | 633    | 911         | 425        | 1033 | 401   | 700        | 717   | 731        | 727       | 330  | 376        | 441  | 410        |      |      |
|                 | (179)       | (247)   | (165) | (261)       | (88)  | (338)      | (277) | (149)      | (426)  | (111)       | (112)      | (90) | (133) | (113)      | (110) | (223)      | (40)      | (25) | (65)       | (60) | (125)      |      |      |

Notes:- Figures in brackets indicate the number of experiments.

APPENDIX I

Statement giving shape and size of plots adopted for crop estimation surveys in different states and aencies for field work for the states and crops covered by the harvest stage inspection programme

| State             | Agency for field work                     | Crops covered                                 | Shape of plot         | Size of the plot                       |
|-------------------|---|---|-----------------------|--|
| 1                 | 2   | 3   | 4                     | 5                                      |
| Andhra Pradesh    | Revenue and Agriculture                   | Paddy, Kh. Jowar, Bajra, Ragi and Rabi Jowar. | Rect.                 | 1/100 acre<br>(50 links x 20 links)    |
| Assam             | Special (Statistical) staff               | Paddy   | Square                | 1/160 acre<br>(16½' x 16½')            |
| Bihar             | Revenue and Development                   | Paddy, maize, Wheat, and Barley               | Rect.                 | 1/80 acre<br>(33' x 16½')              |
| Gujarat           | Revenue and Development                   | Paddy, Kh. Jowar, Bajra, maize and Wheat      | Square                | (1/40 acre<br>(33' x 33')              |
| Jammu and Kashmir | Revenue                                   | maize and wheat                               | Rect.                 | 1/80 acre<br>(33' x 16½')              |
| Kerala            | Special (Statistical) Staff               | Paddy   | Square                | 1/160 acre<br>(16½' x 16½')            |
| Madhya Pradesh    | Revenue                                   | Paddy, Jowar, maize, wheat and Barley         | Rect.                 | 1/80 acre<br>(33' x 16½')              |
| Madras            | Revenue and Agriculture                   | Paddy, Jowar, Bajra and Ragi                  | Rect.                 | 1/100 acre<br>(50 links x 20 links)    |
| Maharashtra       | Revenue                                   | Paddy, Jowar, Bajra, Wheat and Rabi Jowar     | Square                | 1/40.5 acre<br>(10 metres x 10 metres) |
| Madhya Pradesh    | Revenue and Agriculture                   | Paddy, Jowar, Ragi, Wheat and Rabi Jowar.     | Rect.                 | 1/80.9 acre<br>(10 metres x 5 metres)  |
| Orissa            | Special Staff-Amin (Deptt. of Statistics) | Paddy   | Circle                | 1/866.3 of an acre                     |
| Punjab*           | Revenue and Agriculture                   | Paddy, Bajra maize, wheat and Barley          | Rect.                 | 1/80 acre<br>(33' x 16½')              |
| Rajasthan         | Revenue                                   | Jowar, Bajra, maize, wheat and Barley         | Rect.                 | 1/80 acre<br>(33' x 16½')              |
| Uttar Pradesh     | Revenue                                   | Paddy, Jowar, Bajra, maize, wheat and Barley  | Equi-lateral triangle | 1/93.4 acre<br>(Each side 10 metres)   |

\* Plot size (33' x 11') 1/132 acre in hilly areas.



APPENDIX II

Central Driage Experiments, 1963-64

1. The Directorate of NSS initiated the programme of central driage experiments in 1960-61 on a small scale, at the Headquarters (New Delhi). This established the feasibility of carrying out central driage operations at a suitable central place. The central driage experiments were taken up on regular basis from 1961-62 so that driage ratios from them could be readily available for obtaining the yield rate in terms of dried grain from the experiments inspected under the harvest stage inspection programme for which weights of the green produce had been reported by the supervisors.

2. Scale of work: During 1963-64, the supervisors were required to conduct circular cut (of 4' radius) experiments with the ISI instruments in some of the fields selected for harvest stage inspection. They were asked to mail to the headquarters the entire produce (including border plants) obtained from each of the circular cut for the purposes of central driage experiments at Delhi. The produce was received for a total of 711 experiments in Kharif season and 461 experiments in Rabi season. Of these, 41 in Kharif (out of 711) and 48 in Rabi (out of 461) were rejected on account of damage in transit or otherwise not conforming to requirements.

3. Procedure for despatch of bags: The produce for driage experiments at Delhi had to be properly sealed in a cloth bag of white drill and mailed as a Registered parcel. The contents of the produce consisted of cobs/earheads for jowar, bajra, maize and ragi and grain for paddy, wheat and barley.

4. Driage procedure followed at Headquarters: The procedure followed for conduct of these experiments at the headquarters is indicated below:-

- (i) Examination of the contents and taking weight to the nearest 5 grams as soon as the bag was received. The weight of empty bag was also noted.
- (ii) The produce was thereafter put in the bag and the closed bag was exposed to the sun daily (excluding

rainy days and holidays). The bag was exposed till a constant weight was attained in three consecutive weighments. Weighments were taken on alternate days.

(iii) When the constancy had been attained the bag was opened and the weight of dried produce noted.

(iv) In the case of cobs/ear-heads, the produce was threshed and cleaned. The cleaned grain was again exposed to the sun till its weight became steady.

5. Arrangements for storage and driage: For the purpose of storing the bags, a steel Godrej rack covered with a door like frame of wire netting was kept in a closed verandah. This protected the produce from any possible damage from rats etc. The bags were exposed to the sun daily by placing them on a tarpaulin and covered with hen-coop like frame of wire netting. This arrangement protected the produce from damage by birds etc. and at the same time obviated the necessity for a whole-time worker to keep watch on. The weights were used to be taken in a closed verandah with a counter-balance.

6. Results: Table A.II enclosed gives state-wise and crop-wise driage ratios used for this report together with the source of information.

ectase Inactivation 1963-64

| Rabi - Emod Crops |         |              |         |              |        |
|-------------------|---------|--------------|---------|--------------|--------|
| Wheat             |         | Barley       |         | Rabi Jowar   |        |
| Driage ratio      | Sour ce | Driage ratio | Sour ce | Driage ratio | Source |
| 12                | 13      | 14           | 15      | 16           | 17     |

- - - 0.5906 CDE

0.8984 CDE 0.8895 CDE -

0.9314 CDE - -

0.9032 CDE - -

- - - - -  
 0.9148 CDE 0.9401 CDE - -  
 - - - - -

0.9504 CDE - 0.5938 CDE

0.9142 State (63-64) - 0.5750.5751 CDE  
 - - -

0.9353 CDE 0.7912 CDE -

0.9403 CDE 0.9318 CDE -

0.9288 CDE 0.8592 CDE -

Table A. II;

Crop-wise drifago ratios used along with the source, harvest

| State           | Kharif - Food Crops |        |               |                |               |                  |               |        |               |        |
|-----------------|---------------------|--------|---------------|----------------|---------------|------------------|---------------|--------|---------------|--------|
|                 | Paddy               |        | Jowar         |                | Bajra         |                  | Maize         |        | Sagi          |        |
|                 | Drifago ratio       | Source | Drifago ratio | Source         | Drifago ratio | Source           | Drifago ratio | Source | Drifago ratio | Source |
| 1               | 2                   | 3      | 4             | 5              | 6             | 7                | 8             | 9      | 10            | 11     |
| Andhra Pradesh  | 0.8620              | CDE    | 0.5598        | CDE            | 0.5267        | CDE              | -             |        | 0.4370        | CDE    |
| Assam           | 0.8738              | CDE    | -             |                | -             |                  | -             |        | -             |        |
| Bihar           | 0.9136              | CDE    | -             |                | -             |                  | 0.4973        | CDE    | -             |        |
| Gujarat         | 0.8867              | CDE    | 0.5259        | CDE<br>(62-63) | 0.5700        | CDE              | 0.5212        | CDE    | -             |        |
| Jammu & Kashmir | 0.8464              | CDE    | -             |                | -             |                  | 0.5283        | CDE    | -             |        |
| Kerala          | 0.8464              | CDE    | -             |                | -             |                  | -             |        | -             |        |
| Madhya Pradesh  | 0.9076              | CDE    | 0.5536        | CDE            | -             |                  | 0.1280        | CDE    | -             |        |
| Madras          | 0.8722              | CDE    | 0.6330        | CDE            | 0.6668        | CDE              | -             |        | 0.4853        | CDE    |
| Maharashtra     | 0.8624              | CDE    | 0.5863        | CDE            | 0.5674        | CDE              | -             |        | -             |        |
| Mysore          | 0.8901              | CDE    | 0.6270        | CDE            | -             |                  | -             |        | 0.5823        | CDE    |
| Orissa          | 0.8687              | CDE    | -             |                | -             |                  | -             |        | -             |        |
| Punjab          | 0.8616              | CDE    | -             |                | 0.4914        | CDE              | 0.4418        | CDE    | -             |        |
| Rajasthan       | -                   |        | 0.5036        | CDE            | 0.5206        | State<br>(62-68) | 0.5430        | CDE    | -             |        |
| Uttar Pradesh   | 0.8725              | CDE    | 0.6322        | CDE            | 0.5594        | CDE              | 0.4067        | CDE    | -             |        |

## **B. Surveys for Estimation of Crop Areas**

### *B.1. Sample surveys for pre-harvest (advance) estimates of crop acreages*

- B.1.1. . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1955-56.
- B.1.2. . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1956-57 and 1957-58.
- B.1.3. . . . Report on the sample check of field work of the sample survey for pre-harvest (advance) estimates of crop acreages, 1957-58.
- B.1.4. . . . Report on the sample survey for pre-harvest (advance) estimates of crop acreages, 1958-59.
- B.1.5. . . . Review of sample surveys for pre-harvest (advance) estimates of crop acreages, 1953-54 to 1959-60.

### *B.2. Studies on crop areas*

- B.2.1. . . . Report on some aspects of enumeration and compilation of crop areas in the States.

## **C. Surveys in Development Areas**

### *C.1. Crop estimation surveys*

- C.1.1. . . . Report on the crop estimation survey in development areas, Rabi, 1954-55.
- C.1.2. . . . Report on the crop estimation survey in development areas, 1955-56.
- C.1.3. . . . Report on the crop estimation survey in development areas, 1956-57.
- C.1.4. . . . Report on the crop estimation survey in development areas, 1957-58.
- C.1.5. . . . Report on the crop estimation survey in development areas, Kharif, 1958-59.
- C.1.6. . . . Report on the crop estimation survey in development areas, Rabi, 1958-59.
- C.1.7. . . . Report on the crop estimation survey in development areas, 1959-60.
- C.1.8. . . . Review of crop estimation surveys in development areas, 1955-56 to 1959-60.

### *C.2. Estimation of area brought under improved agricultural practices*

- C.2.1. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Andhra Pradesh, Kharif, 1958-59.
- C.2.2. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Uttar Pradesh, Rabi, 1958-59.
- C.2.3. . . . Consolidated results of surveys for estimation of areas brought under improved agricultural practices, 1961-62.

## **D. Surveys for Estimating Benefits of Irrigation**

### *D.1. Area benefited by minor irrigation works*

- D.1.1. . . . Review of minor irrigation assessment surveys, 1951-52 to 1959-60.
- D.1.2. . . . Report on the sample survey for the assessment of the utilisation of tubewells, 1957-58.
- D.1.3. . . . Report on the sample check of new wells (G.M.F.) Rajasthan, 1959.
- D.1.4. . . . Report on the check of minor irrigation works in development areas, Rajasthan, 1959.
- D.1.5. . . . Report on the check of minor irrigation works in development areas, Bihar, 1959.

## **E. In-service Training of Staff**

- E.1. . . . Note on the in-service training of staff.
- E.2. . . . Report on stage II training, Poona, 1961.
- E.3. . . . Report on stage II training, Delhi, 1961.
- E.4. . . . Report on stage III training, Delhi, 1961.
- E.5. . . . Report on stage II training, Delhi, 1962.
- E.6. . . . Report on stage III training, Delhi, 1963.

## **F. Sample Surveys for the Estimation of Fish Catch**

- F.1. . . . Review of the sample surveys for estimating the catch of marine fish, 1950 to 1956.
- F.2. . . . Report on the pilot survey of inland fisheries, Orissa, 1962-63.

## **M. Miscellaneous**

- M.1. . . . Report on the surveys for assessment of additional yield from land reclaimed by Central Tractor Organisation, 1951-52 to 1954-55.

# DIRECTORATE OF NATIONAL SAMPLE SURVEY

(Agricultural Statistics Division)

## List of Publications

### A. Crop Estimation Surveys (State Series)

#### A.1. Annual results

- A.1.1. Consolidated results of crop estimation surveys on principal food crops, 1955-56.
- A.1.2. Consolidated results of crop estimation surveys on principal food crops, 1956-57.
- A.1.3. Consolidated results of crop estimation surveys on principal food crops, 1957-58.
- A.1.4. Consolidated results of crop estimation surveys on principal non-food crops, 1957-58.
- A.1.5. Consolidated results of crop estimation surveys on principal food crops, 1958-59.
- A.1.6. Consolidated results of crop estimation surveys on principal non-food crops, 1958-59.
- A.1.7. Consolidated results of crop estimation surveys on principal food crops, 1959-60.
- A.1.8. Consolidated results of crop estimation surveys on principal non-food crops, 1959-60.
- A.1.9. Consolidated results of crop estimation surveys on principal food crops, 1960-61.
- A.1.10. Consolidated results of crop estimation surveys on principal non-food crops, 1960-61.
- A.1.11. Consolidated results of crop estimation surveys on principal food crops, 1961-62.
- A.1.12. Consolidated results of crop estimation surveys on principal non-food crops, 1961-62.
- A.1.13. Consolidated results of crop estimation surveys on principal food crops, 1949-50 to 1960-61.
- A.1.14. Consolidated results of crop estimation surveys on principal food crops, 1962-63.
- A.1.15. Consolidated results of crop estimation surveys on principal non-food crops, 1962-63.

#### A.2. Supervision of crop cutting experiments

- A.2.1. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Kharif, 1960-61.
- A.2.2. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Rabi, 1960-61.
- A.2.3. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1961-62.
- A.2.4. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1962-63.
- A.2.5. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1963-64.

#### A.3. Special studies

- A.3.1. Report on central driage experiments, 1960-61.
- A.3.2. Report on the joint crop cutting studies at Eundi (Rajasthan), Kharif, 1960-61.
- A.3.3. Report on the joint crop cutting studies at Barh (Bihar), Rabi, 1960-61.
- A.3.4. Report on central driage experiments, 1961-62.
- A.3.5. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1960-61 and 1961-62.
- A.3.6. Report on Central driage experiments, 1962-63.
- A.3.7. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1962-63.
- A.3.8. Report on central driage experiments, 1963-64.
- A.3.9. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1963-64.
- A.3.10. Report on Central driage experiments at NSS block offices, 1962-63.
- A.3.11. Report on Type-2 study on maize, Bihar, 1963-64.
- A.3.12. Report on Type-2 study on paddy, Andhra Pradesh, 1963-64.

(contd. on inner cover)

**CROP ESTIMATION SURVEYS (STATE SERIES)**

**REPORT ON THE INSPECTION OF CROP CUTTING EXPERIMENTS AT  
HARVEST STAGE ON A RANDOMISED BASIS  
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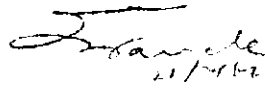
**DIRECTORATE OF NATIONAL SAMPLE SURVEY  
(Agricultural Statistics Division)**

**1965**

## FOREWORD

Since 1957-58 crop production estimates of major cereals in India have become available from two independent and parallel series, the NSS and the official, both based on objective methods of measurement of crop areas and yields. The estimates from the two series differ. While this would need further elaborate investigations it was felt that as a first step, the Directorate's programme of inspection of the field work in the State series of crop cutting experiments may throw some light on the official State estimates of yield rates. Accordingly, inspection of crop-cutting experiments at harvest-stage on a random basis has been organised from 1960-61 onwards. Reports giving results of the work carried out up-to 1963-64 have already been brought out. This report gives the results for 1964-65.

New Delhi  
January , 1966.

  
(S. P. Pande)  
Chief Director



REPORT ON THE INSPECTION OF CROP-CUTTING  
EXPERIMENTS ON A RANDOMISED BASIS, 1964-65

1. Introduction

1.1 Official estimates of crop production for major cereals and other important food grains are obtained for each State in India as a product of the acreage under the crops and the corresponding average yield rates. Figures for crop acreages are, by and large obtained through complete enumeration by village Patwaris of the departments of Revenue in the States, while the other component in the framing of production estimates, viz; the average yield rate, is obtained through crop estimation surveys based on the objective method of random sampling, the technique for which was developed by the Indian Council of Agricultural Research. The field work of these surveys is carried out by the staff of the Department of Agriculture and/or Revenue as a part of their normal departmental work. The surveys are organized by the State Statistical Bureaus under the technical guidance of the Directorate of National Sample Survey, and one of the main functions of the Agricultural Statistics Division of the Directorate relates to a programme of supervision of the field work of the surveys. This supervision, which is carried out with the help of a central team of supervisors, is largely designed to ensure uniformity in concepts, definitions and other details of the surveys from an all-India point of view. The Directorate is also entrusted with the responsibility of consolidation of the results of the surveys for all-India purposes. Starting first as pilot surveys on rice and wheat, the surveys have since 1950 been extended to cover all the principal food and non-food crops of the major States of the Union.

1.2 Since 1957-58 estimates of production of cereal crops have also been made available through <sup>an</sup> independent series of crop surveys based on objective methods of measurement of crop areas and yields, carried out as an integral part of the Socio-economic rounds by the Directorate of National Sample Survey under the technical direction of the Indian Statistical Institute. The field work of these surveys is carried out by whole-time adequately trained Investigators.

1.3 The two sets of cereal production estimates, one based on the State official series, and the other on the NSS-ISI series, were found to show marked divergence, and the Ministry of Food and Agriculture, being responsible for issue of final all-India crop estimates, desired that NSS should organise studies with the available resources in man-power to throw light on the reasons for the differences in the two sets of estimates. They, in particular, wanted to have an independent check on the reliability of the over-all data collected through the crop-estimation surveys of the States, as these formed the basis of the official estimates utilised for taking policy decisions.

1.4 Accordingly, a beginning was made in this direction in 1960-61. The programme of supervision by the Directorate on the field work of the State crop surveys, which was largely extensive in coverage till 1959-60 to cover as many of the primary workers as possible, was reoriented in 1960-61 and intensified to provide reliable data on yield rates of crops from a small sub-sample of fields from the State sample. This was sought to be achieved by ensuring the presence of supervisory staff in the fields selected for this sub-sample on the dates fixed for harvest. A comparison of the estimates obtained from the plots of the

pre-assigned sub-sample so inspected by the central supervisory staff with the estimates of the full sample of the State series was expected to give some indication of the extent of accuracy of the State estimates.

1.5 Considering the strength of the central supervisory team, the sample size manageable by it for such a spot check was necessarily small. Special attention was to be paid to ensure that the field work was carried out according to the prescribed State procedures. If errors were found in the field work of State officials, the central supervisory staff had to rectify these and to take correct measurements. If the State officials were absent the central staff were required to do the work themselves. All possible care was to be taken to avoid any loss of sample observations in the selected sub-sample.

1.6 Based on the experience of the earlier years, the programme of spot check was continued during 1964-65. The present report deals with the results of spot checks for 1964-65.

## 2. Coverage of the spot check

2.1 The programme of spot check during 1964-65 covered eight food crops, viz. paddy, jowar(Kharif and rabi), bajra, maize, ragi, wheat, gram and barley. All of these except gram are covered in the NSS series of surveys. As already mentioned in para 1.3, there are large differences in the estimates of production from the NSS and the official series. Table 0.1 gives an idea of the extent of these differences during 1957-58 and subsequent years.

2.2 The States and crops covered by the programme are shown in table 0.2. It was not found possible to include in the programme for the spot check more area under each of the crops, owing to the limited strength of the central supervisory staff available in the different States. The choice of States and the scale of work proposed in each were based on a consideration of their relative importance in respect of area and production, and the extent of differences in production estimates from the two series of surveys.

Table 0.1: Percentage difference in estimates of production between the NSS and official Series of Crop estimation Surveys.

| Crop                | 1957-58  | 1958-59  | 1959-60  | 1960-61  | 1961-62  | 1962-63  | 1963-64  |
|---------------------|--|--|--|--|--|--|--|
|                     | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ | $\frac{\text{NSS-official}}{\text{official}} \times 100$ |
| 1                   | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| Rice                | 11.4   | 15.3   | 15.3   | 23.9   | 23.0   | 3.0  | 5.4  |
| Jowar<br>(K+R)      | 63.3   | 39.0   | 91.0   | 67.0   | 21.6   | 13.1   | 8.4  |
| Bajr                | 51.1   | 53.3   | 60.3   | 41.0   | 11.3   | 3.4  | 7.6  |
| Maiz                | 73.5   | 104.6  | 73.3   | 65.0   | 43.6   | 37.5   | 25.8   |
| Ragi                | 31.1   | 36.7   | 41.4   | 40.1   | 23.9   | 4.9  | 4.2  |
| Wheat               | 42.8   | 23.2   | 36.4   | 44.4   | 30.3   | 21.0   | 10.2   |
| Barley              | 13.6   | 26.1   | 37.3   | 60.6   | 21.6   | 31.3   | 13.7   |
| All<br>Crops<br>(7) | 32.6   | 36.1   | 37.3   | 33.7   | 24.3   | 13.5   | 3.2  |

Table 0.2: Percentage of All-India official estimate of production (1963-64) accounted for by States for crops covered in the spot check

a - Kharif

| State                       | Paddy | Kharif<br>jowar | Bajra | Maize | Ragi |
|-----------------------------|-------|-----------------|-------|-------|------|
| (1)                         | (2)   | (3)             | (4)   | (5)   | (6)  |
| Andhra Pradesh              | 12    | 13              | 9     | -     | 14   |
| Assam                       | 5     | -               | -     | -     | -    |
| Bihar                       | 12    | -               | -     | 20    | -    |
| Gujarat                     | 1     | 5               | 17    | 5     | -    |
| Jammu & Kashmir             | -     | -               | -     | 4     | -    |
| Kerala                      | 3     | -               | -     | -     | -    |
| Madhya Pradesh              | 9     | 24              | 4     | 13    | -    |
| Madras                      | 11    | 6               | 3     | -     | 13   |
| Maharashtra                 | 4     | 26              | 12    | -     | -    |
| Mysore                      | 4     | 11              | 4     | -     | 41   |
| Orissa                      | 12    | -               | -     | -     | -    |
| Punjab                      | 2     | -               | 3     | 13    | -    |
| Rajasthan                   | -     | 5               | 22    | 13    | -    |
| Uttar Pradesh               | 9     | 9               | 14    | 17    | -    |
| Total for<br>States covered | 84    | 99              | 98    | 90    | 73   |

b - Rabi

| State                       | Wheat | Gram | Barley | R.Jowar |
|-----------------------------|-------|------|--------|---------|
| (1)                         | (2)   | (3)  | (4)    | (5)     |
| Andhra Pradesh              | -     | -    | -      | 20      |
| Bihar                       | 4     | 5    | 3      | -       |
| Gujarat                     | 4     | 1    | -      | -       |
| Jammu & Kashmir             | 1     | -    | -      | -       |
| Madhya Pradesh              | 19    | 13   | 5      | -       |
| Maharashtra                 | 4     | 2    | -      | 54      |
| Mysore                      | 1     | -    | -      | 22      |
| Punjab                      | 29    | 25   | 6      | -       |
| Rajasthan                   | 9     | 12   | 22     | -       |
| Uttar Pradesh               | 23    | 32   | 56     | -       |
| Total for<br>States covered | 99    | 95   | 97     | 96      |

As the table shows, the spot check covered 14 States during the kharif and 10 States during rabi 1964-65, the States covered for jowar (Kharif and rabi), bajra, wheat, gram and barley accounted for 95% or more of the all-India production according to official estimates for these crops. For paddy, the States covered accounted for 34% of the all-India production, and for maize 90%. In the case of ragi alone, the States covered accounted for only 73% of the total ragi production of the country.

### 3. Sampling design.

3.1 Before mention is made of the sampling plan adopted for organising the spot check, it may be well to state briefly the statistical design adopted for crop-estimation surveys in the States. The design (except in the case of Kerala & Orissa) is one of multi-stage random sampling with tehsils (or sub-divisions/ R.I circles) as strata, villages ~~within strata as primary units~~ fields within a village as sampling units at the second stage and, finally, a plot (cut) of a specified size within a sample field as the ultimate unit of sampling. The allocation of experiments for a crop among the strata is generally made on the joint consideration of the acreage under the crop and the number of primary workers available in each stratum, such that the work-load generally for a member of the field staff can easily be managed by him in the course of his other duties. As a general basis, 100-120 experiments are planned in the major crop-growing districts. The experiments in the case of minor districts are so adjusted that the precision of the estimates for the Divisions and for the State as a whole is generally high. In each selected village two fields growing the crop in question are selected at random and in each of them, one plot of a specified size (generally 33' x 16.5')

is marked at random for sample harvest. The measurement of yield of a crop within a sample field, (usually known as a crop-cutting experiment) consists in locating and marking a plot of the required size in the sample fields, harvesting and threshing the produce within it, and recording the weight of the produce. In a sub-sample of cases, the produce harvested from the experimental plot is also dried and processed further for determining the percentage recovery of dried grain from the harvested produce. The size and shape of the sample plot varies from State to State and may be seen in appendix 1.

3.2 The field work of the survey comprising selection of fields and conduct of crop-cutting experiments therein is entrusted to the staff of the State departments of Revenue and/or Agriculture, depending on the work-load and administrative convenience.

3.3 For the purpose of the spot-check a random sub-sample of villages from the State sample was selected and pre-assigned for yield observation among the central staff. The requisite number of villages, corresponding to half the number of experiments proposed for inspection on each crop in each State (except Kerala which provides for three experiments for village), were selected with equal probability and without replacement from the list of villages selected for the State Series. In some of the States the practice of selecting common villages for different crops is in vogue, and the procedure for selecting villages for the spot check, as in earlier years, made use of these common villages as far as possible for selecting a sub-sample which would not exclude any part of the crop coverage in the State series.

#### 4. Sample size

4.1 A total sample of 2,391 experiments (1,431 on kharif crops and 960 in the rabi season) was proposed to be covered under this programme on the specified crops. Statewise and cropwise distribution of the same is given in table O.3 below:-

Table 0.3: Sample size and distribution of work among supervisors.

## A. KHARIF

| State            | No. of supervisors | No. of expts. (@ 2 per village) proposed for inspection at harvest stage |       |       |       |      |       | Average no. of expts. per supervisor |
|------------------|--------------------|--|-------|-------|-------|------|-------|--------------------------------------|
|                  |                    | Paddy  | Jowar | Bajra | Maize | Ragi | Total |                                      |
| 1                | 2                  | 3  | 4     | 5     | 6     | 7    | 8     | 9                                    |
| A.P.             | 7                  | 36   | 30    | 30    | -     | 30   | 126   | 13.0                                 |
| Assam            | 2                  | 36   | -     | -     | -     | -    | 36    | 13.0                                 |
| Bihar            | 8                  | 70   | -     | -     | 50    | -    | 120   | 15.0                                 |
| Gujarat          | 5                  | 20   | 20    | 40    | 20    | -    | 100   | 20.0                                 |
| Jammu & Kashmir) | 2                  | -  | -     | -     | 30    | -    | 30    | 15.0                                 |
| Kerala           | 1                  | 45   | -     | -     | -     | -    | 45    | 45.0                                 |
| M.P.             | 7                  | 20   | 42    | -     | 30    | -    | 92    | 13.1                                 |
| Madras           | 6                  | 40   | 36    | 36    | -     | 20   | 132   | 22.0                                 |
| Maharashtra      | 9                  | 20   | 60    | 56    | -     | -    | 136   | 15.1                                 |
| Mysore           | 8                  | 20   | 33    | 20    | -     | 50   | 123   | 16.0                                 |
| Orissa           | 4                  | 30   | -     | -     | -     | -    | 30    | 20.0                                 |
| Punjab           | 9                  | 20   | -     | 50    | 40    | -    | 110   | 12.2                                 |
| Rajasthan        | 9                  | -  | 30    | 60    | 36    | -    | 126   | 14.0                                 |
| U.P.             | 12                 | 40   | 40    | 40    | 50    | -    | 170   | 14.2                                 |
| Total            | 89                 | 447  | 296   | 332   | 256   | 100  | 1431  | 16.1                                 |

## B. RABI

| State            | No. of supervisors | No. of expts. (@ 2 per village) proposed for inspection at harvest stage |      |        |            |       | Average no. of expts. per supervisor |
|------------------|--------------------|--|------|--------|------------|-------|--------------------------------------|
|                  |                    | Wheat  | Gram | Barley | Rabi Jowar | Total |                                      |
| 1                | 2                  | 3  | 4    | 5      | 6          | 7     | 8                                    |
| A.P.             | 7                  | -  | -    | -      | 60         | 60    | 3.6                                  |
| Bihar            | 8                  | 50   | 30   | 30     | -          | 110   | 13.3                                 |
| Gujarat          | 5                  | 13   | -    | 20     | 20         | 63    | 13.6                                 |
| Jammu & Kashmir) | 2                  | 20   | -    | -      | -          | 20    | 10.0                                 |
| M.P.             | 7                  | 40   | 40   | 20     | -          | 100   | 14.3                                 |
| Maharashtra      | 9                  | 50   | 20   | -      | 30         | 100   | 11.1                                 |
| Mysore           | 7                  | 30   | -    | -      | 60         | 90    | 12.9                                 |
| Punjab           | 9                  | 60   | 40   | 40     | -          | 140   | 15.6                                 |
| Rajasthan        | 8                  | 50   | 30   | 40     | -          | 120   | 15.0                                 |
| U.P.             | 12                 | 60   | 44   | 43     | -          | 152   | 12.7                                 |
| Total            | 74                 | 403  | 204  | 173    | 170        | 960   | 13.0                                 |



As may be seen from the above table, 400-450 experiments on wheat and paddy, between 300 and 350 on kharif jowar and bajra, 250 on maize, about 200 experiments each on gram, barley and rabi jowar, and 100 experiments on ragi were proposed for the inspections. Besides the considerations referred to in paragraph 2.2 above, the strength of the central observers in each State was also kept in view while choosing crops and States and distributing experiments over States.

### 5. Personnel.

5.1 In all, 39 and 74 Supervisors of the Agricultural Statistics Division of the Directorate of NSS, distributed over the different States in kharif and rabi 1964-65 respectively, were entrusted with the inspection programme. Although many of them had considerable experience of work on crop-estimation surveys, they were nevertheless given thorough training in the operation of the programme. The programme in each State was formulated, supervised and coordinated by the respective Regional Officers in charge of the Centre's work in the States. Officers from the headquarters at New Delhi also associated themselves in providing necessary guidance. As table 0.3 shows, the work-load per person for inspections at harvest stage worked out on an average to nearly 3 villages (16 experiments) in kharif, and slightly over 6 villages (13 experiments) in rabi.

### 6. Items of work

6.1 The programme of spot check envisaged selection of villages at the Regional Offices at the State headquarters from the lists of villages selected for the State Series of surveys. These were provided by the respective State

Bureaus or offices of the State Agricultural Statisticians. The spot check consisted, in the main, of getting the State primary workers to visit the selected villages and fields of these sub-samples at the appropriate time in the harvesting season and ensuring that they marked out and harvested plots of the prescribed size in accordance with the State instructions and reported the weight of cleaned harvested produce correctly in the schedules for all the experiments planned for the programme.

6.2 The field work of crop cutting experiments is done in three phases. The first phase consists in identifying the sample villages, selecting fields for yield observations in accordance with the procedure prescribed and fixing the dates of harvesting for yield measurements. The second phase of the work is done on the harvesting day and consists of demarcating the area of sample harvest within the selected field starting from a randomly located point, and taking yield observations therefrom. In the third phase of the work which is done on a sub-sample of the yield measurements, the weight of the dried grain is taken after proper processing.

6.3 Normally, observations by the central team on the field work of the State crop-estimation surveys are carried out at one or more of these phases, those carried out in the first phase being termed pre-harvest checks, those at the second phase harvest checks and those of the third phase post-harvest checks. In the course of their observations at the post-harvest stage the central team also obtains with advantage information through enquiry on the manner in which the work of the earlier phases was carried out. For the programme of the spot check mentioned above, however, emphasis was mainly on observations at the harvest stage. Preliminary visits to the sample villages,

when made, were for the purpose of obtaining dates of harvest of the selected fields, but since the initiation of the programme in 1960-61, these have progressively been minimised, limiting them to cases where the harvest dates could not, otherwise, be had. Generally, in the absence of any special arrangements for obtaining the harvest dates, preliminary visits were paid to the sample villages to avoid loss of experiments. Steps were also taken to ensure that the supervisors covered all the experiments. This involved arrangements for getting information on changes, if any, in the dates fixed earlier for harvests in the sample fields.

6.4 Each sample village was visited on the appropriate day fixed for checking the accuracy of field work of the crop-cutting experiments planned in the sample plots therein and for obtaining the weight of the green crop at the harvest stage. The harvested green crop was in the form of cobs for jowar (kharif and rabi), bajra and maize; earheads for ragi, and grain for paddy, wheat, gram and barley. The removal of the grain and recording of its weight sometimes involved a prolonged stay in the village or even a separate visit at the time of threshing. The dates of harvest for the two experimental plots of a village may also be different, or sometimes the harvesting dates fixed for a village might be changed at the last minute owing to vagaries of the weather or to suit the convenience of cultivators. In such cases more than one visit had to be paid to the village at the harvest stage.

6.5 During kharif 1960-61 when the programme of spot check was first initiated, the Supervisors were required to pay additional visits to the sample villages subsequent to the harvests for observing the driage operations, if these villages selected for the spot check belonged to the sub-sample of villages selected for driage experiments in

the State series. Central driage experiments had since been organised at the Directorate headquarters, and these were continued during 1964-65, and special visits to the sample villages for observing driage experiments could, therefore, be dispensed with. Table 0.4 below gives details of the number of visits paid on an average to a sample village at the pre-harvest and harvest stages for the purpose of the spot check.

Table 0.4: Number of visits per village

A. KHARIF.

| State                   | Average no. of visits per village |         |       |
|-------------------------|-----------------------------------|---------|-------|
|                         | Pre-harvest                       | Harvest | Total |
| 1                       | 2                                 | 3       | 4     |
| Andhra Pradesh          | 0.0                               | 1.2     | 1.2   |
| Assam                   | 0.3                               | 1.3     | 1.6   |
| Bihar                   | 0.4                               | 1.3     | 1.7   |
| Gujarat                 | 0.2                               | 1.1     | 1.3   |
| Jammu & Kashmir         | 0.2                               | 1.0     | 1.2   |
| Kerala                  | 0.9                               | 2.0     | 2.9   |
| Madhya Pradesh          | 0.6                               | 1.2     | 1.8   |
| Madras                  | 1.0                               | 1.6     | 2.6   |
| Maharashtra             | 0.4                               | 1.1     | 1.5   |
| Mysore                  | 1.0                               | 1.1     | 2.1   |
| Orissa                  | 0.0                               | 1.1     | 1.1   |
| Punjab                  | 0.8                               | 1.3     | 2.1   |
| Rajasthan               | 0.8                               | 1.0     | 1.8   |
| Uttar Pradesh           | 0.0                               | 1.1     | 1.1   |
| For all States combined | 0.5                               | 1.2     | 1.7   |

B. R A B I

| State                   | Average no. of visits per village |         |       |
|-------------------------|-----------------------------------|---------|-------|
|                         | Pre-harvest                       | Harvest | Total |
| 1                       | 2                                 | 3       | 4     |
| Andhra Pradesh          | 0.0                               | 1.0     | 1.0   |
| Bihar                   | 0.1                               | 1.2     | 1.3   |
| Gujarat                 | 0.0                               | 1.2     | 1.2   |
| Jammu & Kashmir         | 0.2                               | 1.1     | 1.3   |
| Madhya Pradesh          | 0.2                               | 1.5     | 1.7   |
| Maharashtra             | 0.4                               | 1.5     | 1.9   |
| Mysore                  | 0.8                               | 1.1     | 1.9   |
| Punjab                  | 0.7                               | 2.4     | 3.1   |
| Rajasthan               | 0.5                               | 2.0     | 2.5   |
| Uttar Pradesh           | 0.0                               | 1.6     | 1.6   |
| For all States combined | 0.3                               | 1.5     | 1.8   |

6.6 The programme of work thus generally involved on an average about two visits to a sample village. The average number of visits per village was the highest for Kerala, but in this State, the number of sample cuts per village were three as against two in each village planned in the other States. For States other than Kerala, the average number of visits per village was the highest for Madras, (viz. 2.6) during kharif and for Punjab (viz.3.1) during rabi; the number of visits was the least for Orissa and U.P. (1.1) during kharif and for Andhra Pradesh (1.0) during the rabi season. From past experience, it is seen that a Supervisor is required to spend on the average about two days for each visit to a village (excluding journey-time).

6.7 In addition to the work of inspection at the harvest stage in the pre-assigned sample of villages, the Supervisors were also required to make yield observations from circular sample cuts of 4' radius in a sub-sample of fields (using the I.S.I. instrument) for comparing the yields obtained with those from the State cuts. The results relating to the circular cuts are presented in a separate report. Besides attending to the above-mentioned items of work the supervisors also observed the field work of crop-cutting experiments in villages outside the present programme, and of other surveys relating to agricultural statistics.

#### 7. Formation of zones.

7.1 In organising the programme of spot check in earlier years, the Regional Officers of the Directorate had found it convenient to allocate the work to their Supervisor in the form of compact zones consisting of

6-8 sample villages each. This was adopted in 1964-65 also. The formation of these zones was based on considerations of the harvesting period, location of the sample points and the transport facilities available. The arrangement, by and large, was found workable. It had, however, to be kept flexible to enable suitable decisions to be taken at the Regional Office regarding changes in tour programmes of staff following receipt of intimation about sudden changes made in the harvest dates fixed earlier.

### 8. Execution of the programme

8.1 A major problem faced in the execution of the harvest-stage inspection programme, as in the earlier years, was the disturbance caused by sudden changes in the dates fixed for harvesting the sample plots. There was consequently some considerable risk of observations being missed at the sample fields. However, all efforts were taken to keep the losses to the minimum by maintaining a close contact with the primary workers local officials or other responsible persons in the villages and sometimes even with the cultivators. An idea of the extent of this problem can be had from the fact that in nearly half the number of cases the dates originally fixed had to be changed. The percentage of cases for crops where such changes of dates had to be made were as shown below:-

| Crop | Percentage of expts. where harvest dates were changed | Crop | Percentage of expts. where harvest dates were changed |
|------|---|------|---|
|------|---|------|---|

|                    | <u>K H A R I F</u> |                    | <u>R A B I</u> |
|--------------------|--------------------|--------------------|----------------|
| Paddy              | 45                 | Wheat              | 58             |
| Kh. Jowar          | 58                 | Gram               | 55             |
| Bajra              | 44                 | Barley             | 58             |
| Maize              | 42                 | R. Jowar           | 46             |
| Ragi               | 20                 |                    |                |
| All crops combined | 45                 | All crops combined | 55             |

3.2 There were sometimes also gaps of about a week in the harvest dates for the two experiments in the same village, or between the harvesting and threshing operations for the same experiment. These intervals were utilised for carrying out the other items of work referred to in paragraph 6.7 above. These were, however, taken up only after ensuring that they did not come in the way of the work of the harvest stage inspection programme.

#### 9. Period of field work

9.1 The field work connected with the programme of spot check began in each State about two weeks prior to the harvesting period for each crop covered in the State surveys (except in some of the Southern States where it began about a month earlier), and came to a close as soon as the harvesting season was over. For most States in North India, the harvesting season for kharif crops is spread out over a period of about three months, and for rabi crops, about two months. In the Southern States,





| State        | Duration                     | Paddy |      | Kh. jowar           |      | Bajra               |      | Maize                |      | Ragi                |      |
|--------------|------------------------------|-------|------|---------------------|------|---------------------|------|----------------------|------|---------------------|------|
|              |                              | Month | week | Month               | week | Month               | week | Month                | week | Month               | week |
| 1            | 2                            | 3     | 4    | 5                   | 6    | 7                   | 8    | 9                    | 10   | 11                  | 12   |
| Maha-rashtra | From Oct. II<br>To Nov. II   |       |      | Nov. II<br>Dec. IV  |      | Sept. II<br>Nov. II |      | -                    | -    | -                   | -    |
| Mysore       | From Oct. III<br>To Jan. I   |       |      | Sept. I<br>Dec. III |      | Oct. III<br>Nov. II |      | -                    | -    | Sept. III<br>Dec. I |      |
| Orissa       | From Sept. IV<br>To Dec. II  |       |      | -                   | -    | -                   | -    | -                    | -    | -                   | -    |
| Punjab       | From Oct. II<br>To Nov. II   |       |      | -                   | -    | Sept. IV<br>Nov. I  |      | Sept. III<br>Oct. IV |      | Sept. -             |      |
| Rajasthan    | From -<br>To -               |       |      | Oct. III<br>Dec. II |      | Sept. IV<br>Oct. IV |      | Sept. IV<br>Oct. IV  |      | -                   | -    |
| U.P.(E)      | From Sept. II<br>To Oct. III |       |      | Nov. II<br>Nov. IV  |      | Oct. II<br>Nov. II  |      | Sept. I<br>Oct. I    |      | -                   | -    |
| (L)          | From Nov. II<br>To Nov. IV   |       |      | -                   | -    | -                   | -    | -                    | -    | -                   | -    |

## R A B I

| State          | Duration                    | Wheat |      | Barley              |      | Rb. jowar           |      | Gram                |      |
|----------------|-----------------------------|-------|------|---------------------|------|---------------------|------|---------------------|------|
|                |                             | Month | week | Month               | week | Month               | week | Month               | week |
| 1              | 2                           | 3     | 4    | 5                   | 6    | 7                   | 8    | 9                   | 10   |
| Andhra Pradesh | From -<br>To -              |       |      | -                   | -    | Jan. III<br>Mar. I  |      | -                   | -    |
| Bihar          | From Mar. II<br>To Apr. II  |       |      | May IV<br>Apr. II   |      | -                   | -    | Mar. II<br>Mar. IV  |      |
| Gujarat        | From Jan. II<br>To Feb. IV  |       |      | -                   | -    | -                   | -    | -                   | -    |
| J. & K.        | From Apr. II<br>To May II   |       |      | -                   | -    | -                   | -    | -                   | -    |
| Madhya Pradesh | From Feb. II<br>To Mar. IV  |       |      | Feb. IV<br>Mar. III |      | Feb. II<br>Mar. III |      | -                   | -    |
| Maha-rashtra   | From Jan. II<br>To Mar. IV  |       |      | -                   | -    | Jan. II<br>Feb. IV  |      | Mar. II<br>Apr. I   |      |
| Mysore         | From Jan. II<br>To Feb. II  |       |      | -                   | -    | Jan. IV<br>Mar. I   |      | -                   | -    |
| Punjab         | From Apr. I<br>To Apr. IV   |       |      | May II<br>Apr. II   |      | -                   | -    | Mar. III<br>Apr. IV |      |
| Rajasthan      | From Mar. III<br>To Apr. II |       |      | Mar. II<br>Apr. II  |      | -                   | -    | Mar. II<br>Apr. I   |      |
| Uttar Pradesh  | From Mar. II<br>To Apr. II  |       |      | Mar. II<br>Apr. II  |      | -                   | -    | Mar. II<br>Apr. II  |      |

10. Response

10.1 Of the total number of 2,391 experiments proposed for the spot check, 2,193, or 91.7 per cent were spot-checked at harvest stage. State-wise and crop-wise details are given in table 1 appended. The number of experiments inspected for all crops put together are given below separately for kharif and rabi seasons:-

|               | <u>Planned</u> | <u>Inspected</u> | <u>Percentage inspected</u> |
|---------------|----------------|------------------|-----------------------------|
| Kharif        | 1,431          | 1,286            | 90                          |
| Rabi          | 960            | 907              | 94                          |
| <b>Total:</b> | <b>2,391</b>   | <b>2,193</b>     | <b>92</b>                   |

As may be seen from table 1, the experiments inspected were nearly 90% for paddy, jowar (kharif), bajra, ragi and barley, 93% for maize and 95% or over for wheat, gram and rabi jowar.

10.2 An experiment was considered to have been inspected at the harvest stage only if all the operations connected with the harvest, as prescribed in the State survey, were observed on the spot; e.g. an experiment on wheat or gram would be considered to have been inspected at the harvest stage only if the operations of harvesting, threshing and weightment of grain were observed. However, in Maharashtra and Gujarat, for the crops of jowar (kharif and rabi), bajra and maize, it was considered enough if the inspection was confined to observation of the harvesting and weightment of the produce in the form of cobs.

10.3 All care was taken to see that substitutions of sample villages or fields within villages were the minimum. Substitutions were permitted only in those cases where the crop in a selected village/field was harvested by the

cultivators before conduct of the experiment, provided instructions issued by the State allowed for substitution in such circumstances. Of the experiments inspected during the kharif season, substitution of fields had to be done in about 11.4 per cent cases, while for rabi, the percentage of such cases was about 11.2. State-wise and crop-wise details of substitutions are given in table 1 appended.

10.4 Mention was made in para 6.5 that special visits to sub-sample villages selected for driage experiments in the State series were not undertaken during 1964-65. Instead, as in earlier years, the Directorate arranged for driage experiments to be carried out centrally at Delhi under controlled conditions. For this purpose the crop produce from circular cuts referred to in para 8.7 was mailed to Delhi direct from the field. Some details of the procedure followed for the control driage experiments at Delhi, along with the driage ratios used for this report are given in appendix II. A detailed report on the central driage experiments has been brought out separately. Besides giving State-wise and crop-wise details of responses obtained and substitutions made, table 1 also gives the number of driage experiments conducted centrally.

#### 11. Estimation procedure

11.1 In the crop estimation surveys in States, sample fields for a specified crop in a village are selected from all the fields growing the crop, irrespective of whether that crop is sown alone in the field (pure) or in mixture with other crops (mixed). The estimate of the average yield rate worked out by treating the sample plot yields as directly obtained from the cuts, irrespective of whether the cuts were from pure-sown fields or from fields sown

with crops in mixture, is termed the gross yield rate. If plot yields from mixed fields are divided by the corresponding proportions of area under the crop in the fields obtained by eye estimation, and then added to the plot yields from all the plots sown with the pure crop, the resulting estimate of average yield is termed the net yield rate.

11.2 Data from experiments inspected under the programme were tabulated and State-wise gross and net yield rates obtained, together with the standard errors of the net yield rates. The yield rate of a crop at State level was obtained as a simple average in terms of the green harvested produce, and then multiplied with the corresponding ~~driage~~ ratio. It has been mentioned above that central driage experiments were organised at Delhi on food crops during 1964-65. The driage ratios based on these central driage experiments were utilised to obtain estimates of the yield rates in terms of the dry grain.

11.3 The yield rates (in terms of dried grain) were pooled over States by using the respective crop areas as weights. The standard errors of the estimates were obtained from the usual formula for two-stage simple random sampling.

## 12. Results

12.1 Table 0.6 below gives, State-wise and crop-wise, the net yield rates based on experiments inspected under the present programme. The yield rates are in terms of dried grain.

Table 0.6: Net yield rates (dried grain in lbs/acre)Kharif, 1951-55

| State                         | Rice          |            |        | Kharif jowar  |            |        | Bajra         |            |        | Maize         |            |        | Ragi          |            |        |
|-------------------------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                               | No. of expts. | yield rate | % S.D. | No. of expts. | yield rate | % S.D. | No. of expts. | yield rate | % S.D. | No. of expts. | yield rate | % S.D. | No. of expts. | yield rate | % S.D. |
| (1)                           | (2)           | (3)        | (4)    | (5)           | (6)        | (7)    | (8)           | (9)        | (10)   | (11)          | (12)       | (13)   | (14)          | (15)       | (16)   |
| Andhra Pradesh                | 36            | 1077       | 11.7   | 26            | 275        | 15.7   | 29            | 225        | 20.22  | -             | -          | -      | 20            | 122        | 17.9   |
| Assam                         | 36            | 783        | 11.4   | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Bihar                         | 62            | 827        | 8.0    | -             | -          | -      | -             | -          | -      | 48            | 618        | 12.8   | -             | -          | -      |
| Gujarat                       | 19            | 677        | 24.7   | 13            | 235        | 50.0   | 32            | 340        | 15.5   | 20            | 1200       | 16.2   | -             | -          | -      |
| Jammu & Kashmir               | -             | -          | -      | -             | -          | -      | -             | -          | -      | 27            | 1081       | 18.1   | -             | -          | -      |
| Kerala                        | 43            | 1047       | 9.3    | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh                | 20            | 565        | 14.7   | 38            | 859        | 15.5   | -             | -          | -      | 30            | 813        | 15.5   | -             | -          | -      |
| Madras                        | 38            | 1284       | 9.7    | 35            | 523        | 15.7   | 29            | 273        | 14.1   | -             | -          | -      | 19            | 867        | 29.5   |
| Maharashtra                   | 19            | 1005       | 15.1   | 58            | 734        | 17.8   | 54            | 173        | 18.3   | -             | -          | -      | -             | -          | -      |
| Mysore                        | 18            | 871        | 20.7   | 33            | 690        | 17.6   | 18            | 209        | 23.7   | -             | -          | -      | 43            | 652        | 13.2   |
| Orissa                        | 61            | 1071       | 6.6    | -             | -          | -      | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Punjab                        | 18            | 1043       | 14.7   | -             | -          | -      | 50            | 273        | 13.1   | 39            | 846        | 20.8   | -             | -          | -      |
| Rajasthan                     | -             | -          | -      | 27            | 285        | 24.2   | 47            | 203        | 17.6   | 31            | 1289       | 10.6   | -             | -          | -      |
| Uttar Pradesh                 | 33            | 641        | 11.1   | 30            | 643        | 15.5   | 36            | 880        | 13.9   | 43            | 924        | 10.9   | -             | -          | -      |
| Total for all States covered: | 403           | 830        | 3.5    | 260           | 582        | 7.8    | 295           | 239        | 7.3    | 238           | 922        | 5.5    | 90            | 691        | 11.1   |

Rabi, 1964-65

| State           | Wheat         |            |        | Gram          |            |        | Barley        |            |        | Rabi jowar    |            |        |
|-----------------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|---------------|------------|--------|
|                 | No. of expts. | yield rate | % S.S. | No. of expts. | yield rate | % S.S. | No. of expts. | yield rate | % S.S. | No. of expts. | yield rate | % S.S. |
| (1)             | (17)          | (18)       | (19)   | (20)          | (21)       | (22)   | (23)          | (24)       | (25)   | (26)          | (27)       | (28)   |
| Andhra Pradesh  | -             | -          | -      | -             | -          | -      | -             | -          | -      | 60            | 273        | 12.6   |
| Bihar           | 50            | 602        | 19.5   | 30            | 542        | 17.0   | 26            | 390        | 11.7   | -             | -          | -      |
| Gujarat         | 46            | 839        | 12.3   | -             | -          | -      | -             | -          | -      | 17            | 388        | 13.3   |
| Jammu & Kashmir | 18            | 542        | 21.9   | -             | -          | -      | -             | -          | -      | -             | -          | -      |
| Madhya Pradesh  | 40            | 535        | 14.0   | 34            | 305        | 14.5   | 13            | 499        | 24.7   | -             | -          | -      |
| Maharashtra     | 48            | 607        | 11.4   | 20            | 414        | 12.6   | -             | -          | -      | 28            | 513        | 22.0   |
| Mysore          | 30            | 287        | 13.3   | -             | -          | -      | -             | -          | -      | 57            | 575        | 11.4   |
| Punjab          | 58            | 1095       | 10.3   | 40            | 776        | 12.2   | 36            | 1117       | 14.2   | -             | -          | -      |
| Rajasthan       | 42            | 777        | 10.9   | 27            | 226        | 17.4   | 35            | 864        | 14.3   | -             | -          | -      |
| Uttar Pradesh   | 60            | 939        | 9.6    | 42            | 398        | 13.8   | 45            | 877        | 11.5   | -             | -          | -      |
| States covered: | 392           | 789        | 5.1    | 193           | 457        | 6.9    | 160           | 796        | 8.0    | 102           | 494        | 12.7   |

12.2 The results suggest the following observations:-

(i) The yield rates at all-India level, i.e. for the States covered, have been estimated with standard errors of the order of 4-6 per cent for rice, wheat and maize, 7-8 per cent for kharif jowar, bajra, gram and barley, 11 per cent for ragi and 13 per cent for rabi jowar. Covering all the food crops and States together, the combined yield rate, using the respective areas as weights, was estimated with standard error of about 2.5 per cent.

(ii) It was not the aim of the spot check to provide estimates of yield rates at the State level with adequate precision, and the standard errors of the estimates are therefore, naturally high at this level. The yield rate has however been estimated with standard error less than 10 per cent at the State level for rice in Bihar, Kerala, Madras and Orissa and of about 10 per cent for maize in Rajasthan and Uttar Pradesh, and for wheat in Punjab, Rajasthan and Uttar Pradesh.

(iii) The estimated yield rate per acre is of the order of 900 lbs. for rice and maize; 800 lbs. for wheat and barley, 700 lbs. for ragi, 600 lbs. for kharif jowar, 500 lbs. for rabi jowar, 450 lbs. for gram and 300 lbs. for bajra.

### 13. Comparison with yield rates from the State series.

13.1 Table 0.7 below gives a comparison of the yield rates obtained from the present harvest-stage inspection programme with the corresponding yield estimates obtained from the State series. It may be remarked that the plot yields in fields selected for the harvest-stage inspection sample have been included in the State tabulation while framing estimates for the State series.

Table 0.7: Comparison of Net yield rates, State series and from harvest inspection data

## A. KHARIF

| State | Net yield rates<br>(lbs/acre)         |   | Percentage difference<br>Col.2 - col.3x 100 |
|-------|---------------------------------------|---|---|
|       | State<br>Series<br>(Final<br>1964-65) | Harvest<br>inspec-<br>tion<br>(1964-65) | Col.2                                       |
| 1     | 2                                     | 3                                       | 4   |

Rice\*

|                |      |      |        |
|----------------|------|------|--------|
| Andhra Pradesh | 1290 | 1077 | 16.5   |
| Assam          | 912  | 783  | 14.1   |
| Bihar          | 351  | 827  | 2.3    |
| Gujarat        | 733  | 677  | 14.1   |
| Madhya Pradesh | 744  | 535  | 24.1   |
| Madras         | 1351 | 1234 | 5.0    |
| Maharashtra    | 965  | 1005 | - 4.1  |
| Mysore         | 1401 | 871  | 37.8   |
| Orissa         | 912  | 1071 | - 17.4 |
| Punjab         | 1141 | 1043 | 8.6    |
| Uttar Pradesh  | 634  | 641  | 3.5    |
| States covered | 913  | 375  | 7.2    |

Jowar +

|                |     |     |       |
|----------------|-----|-----|-------|
| Andhra Pradesh | 410 | 275 | 32.9  |
| Gujarat        | 231 | 235 | - 0.3 |
| Madhya Pradesh | 749 | 359 | -14.7 |
| Maharashtra    | 594 | 731 | -23.6 |
| Mysore         | 527 | 390 | -30.9 |
| Rajasthan      | 305 | 235 | 3.6   |
| Uttar Pradesh  | 535 | 643 | - 9.9 |
| States covered | 522 | 536 | -12.3 |



| 1              | 2              | 3   | 4     |
|----------------|----------------|-----|-------|
|                | <u>Bajra +</u> |     |       |
| Andhra Pradesh | 421            | 225 | 46.6  |
| Gujarat        | 514            | 340 | 33.9  |
| Maharashtra    | 253            | 173 | 31.6  |
| Mysore         | 213            | 209 | 4.1   |
| Punjab         | 325            | 273 | 16.0  |
| Rajasthan      | 233            | 203 | 12.9  |
| Uttar Pradesh  | 578            | 880 | -52.2 |
| States covered | 322            | 290 | 9.9   |

|                 |              |      |        |
|-----------------|--------------|------|--------|
|                 | <u>Maize</u> |      |        |
| Bihar           | 730          | 618  | 15.3   |
| Gujarat         | 1146         | 1200 | - 4.7  |
| Jammu & Kashmir | 1349         | 1081 | 19.9   |
| Madhya Pradesh  | 1009         | 813  | 19.4   |
| Punjab          | 1175         | 846  | 23.0   |
| Rajasthan       | 931          | 1289 | - 31.4 |
| Uttar Pradesh   | 698          | 924  | - 32.4 |
| States covered  | 917          | 922  | - 0.6  |

|                |               |     |      |
|----------------|---------------|-----|------|
|                | <u>Ragi +</u> |     |      |
| Andhra Pradesh | 763           | 622 | 13.5 |
| Mysore         | 704           | 652 | 7.4  |
| States covered | 719           | 615 | 10.3 |

3. RABI

|                 |              |     |        |
|-----------------|--------------|-----|--------|
|                 | <u>Wheat</u> |     |        |
| Bihar           | 586          | 602 | - 2.7  |
| Gujarat         | 866          | 339 | 3.1    |
| Jammu & Kashmir | 553          | 542 | 2.0    |
| Madhya Pradesh  | 587          | 535 | 3.9    |
| Maharashtra     | 405          | 607 | - 49.9 |

| 1              | 2    | 3                 | 4      |
|----------------|------|-------------------|--------|
| Mysore         | 345  | 237               | 13.8   |
| Punjab         | 1229 | 1095              | 10.9   |
| Rajasthan      | 832  | 777               | 6.3    |
| Uttar Pradesh  | 922  | 939               | - 1.8  |
| States covered | 313  | 789               | 3.0    |
|                |      | <u>Gram</u>       |        |
| Bihar          | 539  | 542               | - 0.6  |
| Madhya Pradesh | 514  | 305               | 40.7   |
| Maharashtra    | 295  | 414               | - 40.3 |
| Punjab         | 697  | 776               | - 11.3 |
| Rajasthan      | 472  | 226               | 47.9   |
| Uttar Pradesh  | 659  | 333               | 39.6   |
| States covered | 583  | 457               | 22.3   |
|                |      | <u>Barley</u>     |        |
| Bihar          | 467  | 390               | 16.5   |
| Madhya Pradesh | 364  | 499               | 42.3   |
| Punjab         | 1039 | 1117              | - 7.5  |
| Rajasthan      | 373  | 864               | 11.2   |
| Uttar Pradesh  | 363  | 377               | - 1.3  |
| States covered | 337  | 793               | 4.9    |
|                |      | <u>Rabi Jowar</u> |        |
| Andhra Pradesh | 424  | 278               | 34.4   |
| Gujarat        | 629  | 338               | - 41.2 |
| Maharashtra    | 409  | 513               | - 25.4 |
| Mysore         | 458  | 575               | - 25.6 |
| States covered | 430  | 494               | - 14.9 |

Note: (i) Out turn of Rice has been taken as  $\frac{2}{3}$  that of paddy.

(ii) \* excluding Kerala.

(iii) + excluding Madras.

13.2 Comparing the results obtained from the inspected plot yields with those of the State series, it is seen that at all-India level, i.e. for the States covered, the differences were less than 5 per cent for wheat, maize and barley; 7.2 per cent for rice, 10 per cent for bajra and ragi, 12-15 per cent for jowar (kharif and rabi) and 22 per cent for gram. From the standard errors of the yield rates based on the data from harvest-stage inspections, these differences do not appear to be statistically significant except in the case of gram.

13.3 Out of 53 comparisons in all at State level the differences (State estimate - central estimate) were negative in 22 cases and positive in the remaining 36 cases.

#### 14. Classificatory analysis

14.1 Although the main objective of the programme was to obtain independent estimates of yields per acre of the principal food crops, information was also collected on certain cultivation practices. The data were accordingly analysed for obtaining separately estimates of gross and net yield rates of each of the sub-categories of fields under the following four categories which may be of some special interest:

| <u>Category</u> | <u>Sub-categories</u>                                 |
|-----------------|---|
| 1               | Irrigated, unirrigated                                |
| 2               | Manured, not manured                                  |
| 3               | Improved seed, local seed                             |
| 4               | Crops sown pure, crops sown in mixture (mixed crops). |

The detailed State-wise and crop-wise results by categories are given in table 2 appended. The summary results for individual crops at all-India level, i.e. for the States covered, are presented in table 0.3.

Table 0.3: Classificatory Analysis - Yield Rates (lbs/acre of dried grain)KHARIF

| Crop            | Category-1     |                       | Category-2    |                      | Category-3            |               | Category-4   |              | Com-<br>bined |
|-----------------|----------------|-----------------------|---------------|----------------------|-----------------------|---------------|--------------|--------------|---------------|
|                 | Irri-<br>gated | Un-<br>irri-<br>gated | Manu-<br>red  | Not-<br>manu-<br>red | Impro-<br>ved<br>seed | Local<br>seed | Pure         | Mixed        |               |
| 1               | 2              | 3                     | 4             | 5                    | 6                     | 7             | 8            | 9            | 10            |
|                 | <u>GROSS</u>   |                       |               |                      |                       |               |              |              |               |
| Rice            | 1013<br>(114)  | 787<br>(239)          | 970<br>(248)  | 675<br>(155)         | 835<br>(95)           | 903<br>(303)  | -            | -            | 878<br>(403)  |
| Kharif<br>Jowar | -              | -                     | 581<br>(75)   | 363<br>(135)         | -                     | -             | 514<br>(76)  | 431<br>(184) | 426<br>(260)  |
| Bajra           | -              | -                     | 349<br>(37)   | 194<br>(208)         | -                     | -             | 241<br>(156) | 167<br>(139) | 231<br>(295)  |
| Maize           | 967<br>(26)    | 332<br>(212)          | 1021<br>(135) | 600<br>(103)         | -                     | -             | 917<br>(177) | 701<br>(61)  | 852<br>(238)  |
| Ragi            | 1262<br>(16)   | 488<br>(74)           | 675<br>(65)   | 383<br>(25)          | -                     | -             | 704<br>(47)  | 536<br>(43)  | 625<br>(90)   |
|                 | <u>NET</u>     |                       |               |                      |                       |               |              |              |               |
| Rice            | 1013<br>(114)  | 739<br>(239)          | 971<br>(248)  | 677<br>(155)         | 835<br>(95)           | 910<br>(303)  | -            | -            | 810<br>(403)  |
| Kharif<br>Jowar | -              | -                     | 373<br>(75)   | 479<br>(185)         | -                     | -             | 514<br>(76)  | 524<br>(184) | 532<br>(260)  |
| Bajra           | -              | -                     | 394<br>(87)   | 260<br>(203)         | -                     | -             | 241<br>(156) | 276<br>(139) | 230<br>(295)  |
| Maize           | 1094<br>(26)   | 902<br>(212)          | 1064<br>(135) | 706<br>(103)         | -                     | -             | 917<br>(177) | 953<br>(61)  | 922<br>(233)  |
| Ragi            | 1296<br>(16)   | 551<br>(74)           | 750<br>(65)   | 428<br>(25)          | -                     | -             | 704<br>(47)  | 691<br>(43)  | 691<br>(90)   |

RABI

| Crop | Category-1     |                       | Category-2   |                     | Category-3            |               | Category-4 |       | Com-<br>bined |
|------|----------------|-----------------------|--------------|---------------------|-----------------------|---------------|------------|-------|---------------|
|      | Irri-<br>gated | Un-<br>irri-<br>gated | Manu-<br>red | Not<br>manu-<br>red | Impro-<br>ved<br>seed | Local<br>seed | Pure       | Mixed |               |
| 1    | 2              | 3                     | 4            | 5                   | 6                     | 7             | 8          | 9     | 10            |

GROSS

|               |              |              |              |              |             |              |              |              |              |
|---------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Wheat         | 308<br>(153) | 514<br>(234) | 304<br>(133) | 584<br>(259) | 814<br>(82) | 570<br>(310) | 699<br>(230) | 532<br>(162) | 654<br>(392) |
| Gram          | 407<br>(29)  | 332<br>(164) | -            | -            | -           | -            | 447<br>(91)  | 239<br>(102) | 338<br>(133) |
| Barley        | 370<br>(87)  | 460<br>(93)  | 855<br>(49)  | 540<br>(111) | -           | -            | 703<br>(78)  | 616<br>(32)  | 653<br>(160) |
| Rabi<br>Jowar | -            | -            | 1045<br>(55) | 331<br>(107) | -           | -            | 369<br>(103) | 519<br>(54)  | 447<br>(162) |

NET

|               |              |              |              |              |             |              |              |              |              |
|---------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Wheat         | 893<br>(153) | 659<br>(234) | 884<br>(133) | 733<br>(259) | 901<br>(32) | 707<br>(310) | 699<br>(230) | 871<br>(162) | 789<br>(392) |
| Gram          | 559<br>(29)  | 447<br>(164) | -            | -            | -           | -            | 447<br>(91)  | 449<br>(102) | 157<br>(133) |
| Barley        | 1018<br>(87) | 537<br>(93)  | 916<br>(49)  | 722<br>(111) | -           | -            | 703<br>(78)  | 394<br>(32)  | 796<br>(160) |
| Rabi<br>Jowar | -            | -            | 1079<br>(55) | 416<br>(107) | -           | -            | 369<br>(108) | 625<br>(54)  | 494<br>(132) |

14.2 It may be seen from the table that results have not been presented for all crops under each category. This was because of the small number of observations in the missing categories which were inadequate to provide estimates under the two sub-categories for purposes of comparison. For instance, crops like jowar and bajra are mostly raised under unirrigated conditions. Further, very few fields were seen to be sown with improved seed for any of the crops, except rice and wheat. In the discussion of the results below it has to be borne in mind that any differential effect seen with a particular classification is not necessarily the net effect of the factor entering into that classification but should rather be regarded as the combined effect of that and other possible factors as well.

14.3 Irrigated Vs. unirrigated:- The yield rate obtained from the irrigated fields was higher than the yield rate from the unirrigated fields by about 200 lbs/acre for rice and maize, 250 lbs/acre for wheat, about 400 lbs/acre for barley and nearly 750 lbs/acre for ragi. The increase in the yield rate for irrigated gram was of the order of 100 lbs/acre.

14.4 Manured Vs. not manured:- The term "manure" here included all the common types of manure, viz. farmyard manure, fertilizers, compost, oil cakes etc. As the table shows, the yield rate obtained from manured fields was considerably in excess of that from non-manured fields.

14.5 Improved Vs. local seed:- The yield rate from fields sown with improved seed was more than the yield rate from fields sown with local seed by about 200 lbs/acre for wheat. However, for rice, the difference in

the yield rates from the two types of fields was about 75 lbs/acres.

14.6 Crops sown pure Vs. crops sown in mixture:- The gross yield rates from mixed sown fields are expected to be lower than the yield rates from pure sown fields. This was observed to be so for all the crops. The net yield rates from the mixed fields (obtained by raising the gross yields in inverse proportion of the extent of that crop in the mixture) were observed to be of the same order as the yield rates from pure fields for bajra, maize, ragi and gram; they were higher for kharif-jowar, wheat, barley and rabi-jowar.

#### 15. Conclusions

15.1 This programme of spot check has shown that the differences between the State series and central supervision results were small for maize, wheat, and barley, but somewhat high for the crops rice, jowar (kharif and rabi), bajra, ragi and gram. The difference <sup>was</sup> statistically significant only in the case of gram.

15.2 The percentage standard error of the yield rates based on data from the sample check was at all-India level (i.e. for the States covered in each case) 4 per cent for rice, 5 per cent for maize and wheat, 7-8 per cent for kharif-jowar, bajra, gram and barley, 11 per cent for ragi and 13 per cent for rabi jowar. For all **the crops** and States put together the combined yield rate was estimated with standard error of the order of 3 per cent.

Table 1(a): Number of experiments planned, inspected, substituted and Central drriage experiments - Kharif, 1964-65

| State                         | P A D D Y     |            |                      |           |              |                               | K H A R I F J O W A R |            |                      |           |              |                               |
|-------------------------------|---------------|------------|----------------------|-----------|--------------|-------------------------------|-----------------------|------------|----------------------|-----------|--------------|-------------------------------|
|                               | No. of Expts. |            | No. of Substitutions |           |              | No. of central drriage expts. | No. of Expts.         |            | No. of Substitutions |           |              | No. of central drriage expts. |
|                               | Planned       | Ins-pected | Village              | Expts.    | Total Expts. |                               | Planned               | Ins-pected | Village              | Expts.    | Total Expts. |                               |
| 1                             | 2             | 3          | 4                    | 5         | 6            | 7                             | 8                     | 9          | 10                   | 11        | 12           | 13                            |
| Andhra Pradesh                | 36            | 36         | -                    | 7         | 7            | 21                            | 30                    | 26         | -                    | 2         | 2            | 15                            |
| Assam                         | 36            | 36         | -                    | 2         | 2            | 28                            | -                     | -          | -                    | -         | -            | -                             |
| Bihar                         | 70            | 62         | -                    | 23        | 23           | 36                            | -                     | -          | -                    | -         | -            | -                             |
| Gujarat                       | 20            | 19         | -                    | 2         | 2            | 15                            | 20                    | 13         | -                    | 4         | 4            | 12                            |
| Jammu & Kashmir               | -             | -          | -                    | -         | -            | -                             | -                     | -          | -                    | -         | -            | -                             |
| Kerala                        | 45            | 43         | -                    | -         | -            | 23                            | -                     | -          | -                    | -         | -            | -                             |
| Madhya Pradesh                | 20            | 20         | -                    | -         | -            | 18                            | 42                    | 38         | -                    | -         | -            | 35                            |
| Madras                        | 40            | 38         | -                    | -         | -            | 19                            | 36                    | 35         | -                    | 2         | 2            | 23                            |
| Maharashtra                   | 20            | 19         | -                    | 4         | 4            | 20                            | 60                    | 58         | 1                    | 7         | 9            | 57                            |
| Mysore                        | 20            | 18         | -                    | 2         | 2            | 15                            | 38                    | 33         | -                    | 6         | 6            | 34                            |
| Orissa                        | 80            | 61         | -                    | 5         | 5            | -                             | -                     | -          | -                    | -         | -            | -                             |
| Punjab                        | 20            | 18         | -                    | -         | -            | 16                            | -                     | -          | -                    | -         | -            | -                             |
| Rajasthan                     | -             | -          | -                    | -         | -            | -                             | 30                    | 27         | -                    | -         | -            | 19                            |
| Uttar Pradesh                 | 40            | 33         | -                    | 2         | 2            | 28                            | 40                    | 30         | -                    | 3         | 3            | 27                            |
| <b>Total (States covered)</b> | <b>447</b>    | <b>403</b> | <b>-</b>             | <b>47</b> | <b>47</b>    | <b>239</b>                    | <b>296</b>            | <b>260</b> | <b>1</b>             | <b>24</b> | <b>26</b>    | <b>222</b>                    |



Table 1 (a): (Contd.)

| State                  | B A J R A               |                |                          |                            |                 | M A I Z E                                    |                         |                |                          |                            | R A G I         |  |                         |                |                          |                            |                 |  |
|------------------------|-------------------------|----------------|--------------------------|----------------------------|-----------------|--|-------------------------|----------------|--------------------------|----------------------------|-----------------|--|-------------------------|----------------|--------------------------|----------------------------|-----------------|--|
|                        | No. of ex-<br>periments | Ins-<br>pected | Village<br>Substitutions | No. of<br>Experi-<br>ments | Total<br>Expts. | No. of<br>cent-<br>ral<br>drillage<br>expts. | No. of ex-<br>periments | Ins-<br>pected | Village<br>Substitutions | No. of<br>Experi-<br>ments | Total<br>Expts. | No. of<br>cent-<br>ral<br>drillage<br>expts. | No. of ex-<br>periments | Ins-<br>pected | Village<br>Substitutions | No. of<br>Experi-<br>ments | Total<br>Expts. | No. of<br>cent-<br>ral<br>drillage<br>expts. |
| 1                      | 14                      | 15             | 16                       | 17                         | 18              | 19   | 20                      | 21             | 22                       | 23                         | 24              | 25   | 26                      | 27             | 28                       | 29                         | 30              | 31   |
| Andhra Pradesh         | 30                      | 29             | -                        | 5                          | 5               | 21   | -                       | -              | -                        | -                          | -               | -  | 30                      | 28             | -                        | 6                          | 6               | 22   |
| Assam                  | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  |
| Bihar                  | -                       | -              | -                        | -                          | -               | -  | 50                      | 48             | 2                        | 19                         | 23              | 34   | -                       | -              | -                        | -                          | -               | -  |
| Gujarat                | 40                      | 32             | -                        | 4                          | 4               | 28   | 20                      | 20             | -                        | -                          | -               | 20   | -                       | -              | -                        | -                          | -               | -  |
| Jammu & Kashmir        | -                       | -              | -                        | -                          | -               | -  | 30                      | 27             | -                        | -                          | -               | 28   | -                       | -              | -                        | -                          | -               | -  |
| Kerala                 | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  |
| Madhya Pradesh         | -                       | -              | -                        | -                          | -               | -  | 30                      | 30             | -                        | -                          | -               | 27   | -                       | -              | -                        | -                          | -               | -  |
| Madras                 | 36                      | 29             | -                        | -                          | -               | 25   | -                       | -              | -                        | -                          | -               | 20   | 19                      | -              | -                        | -                          | -               | 13   |
| Maharashtra            | 56                      | 54             | -                        | 5                          | 5               | 41   | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  |
| Mysore                 | 20                      | 18             | -                        | 3                          | 3               | 13   | -                       | -              | -                        | -                          | -               | 50   | 43                      | -              | 11                       | 11                         | 40              | -  |
| Orissa                 | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  | -                       | -              | -                        | -                          | -               | -  |
| Punjab                 | 50                      | 50             | -                        | 1                          | 1               | 37   | 40                      | 39             | -                        | 4                          | 4               | 24   | -                       | -              | -                        | -                          | -               | -  |
| Rajasthan              | 60                      | 47             | -                        | -                          | -               | 32   | 36                      | 31             | -                        | -                          | -               | 27   | -                       | -              | -                        | -                          | -               | -  |
| Uttar Pradesh          | 40                      | 36             | -                        | 7                          | 7               | 28   | 50                      | 43             | -                        | 5                          | 5               | 38   | -                       | -              | -                        | -                          | -               | -  |
| Total (States covered) | 332                     | 295            | -                        | 25                         | 25              | 225  | 256                     | 238            | 2                        | 28                         | 32              | 198  | 100                     | 90             | -                        | 17                         | 17              | 75   |

Table 1 (b): Number of experiments planned, inspected, substituted and Central drriage experiments - Kabi 1964-65.

| State                         | W H E A T     |            |                      |           |              |                               | G R A M       |            |                      |           |              |                               |
|-------------------------------|---------------|------------|----------------------|-----------|--------------|-------------------------------|---------------|------------|----------------------|-----------|--------------|-------------------------------|
|                               | No. of Expts. |            | No. of Substitutions |           |              | No. of central drriage expts. | No. of Expts. |            | No. of Substitutions |           |              | No. of central drriage expts. |
|                               | Planned       | Ins-pected | Village              | Expts.    | Total Expts. |                               | Planned       | Ins-pected | Village              | Expts.    | Total Expts. |                               |
| 1                             | 2             | 3          | 4                    | 5         | 6            | 7                             | 8             | 9          | 10                   | 11        | 12           | 13                            |
| Andhra Pradesh                | -             | -          | -                    | -         | -            | -                             | -             | -          | -                    | -         | -            | -                             |
| Bihar                         | 50            | 50         | 1                    | 9         | 11           | 27                            | 30            | 30         | 2                    | 16        | 20           | 26                            |
| Gujarat                       | 48            | 46         | -                    | 2         | 2            | 26                            | -             | -          | -                    | -         | -            | -                             |
| Jammu & Kashmir               | 20            | 18         | -                    | 1         | 1            | 16                            | -             | -          | -                    | -         | -            | -                             |
| Madhya Pradesh                | 40            | 40         | -                    | -         | -            | 30                            | 40            | 34         | -                    | -         | -            | 26                            |
| Maharashtra                   | 50            | 48         | -                    | 4         | 4            | 26                            | 20            | 20         | -                    | 6         | 6            | 20                            |
| Mysore                        | 30            | 30         | -                    | 3         | 3            | 26                            | -             | -          | -                    | -         | -            | -                             |
| Punjab                        | 60            | 58         | -                    | 2         | 2            | 29                            | 40            | 40         | -                    | 1         | 1            | 37                            |
| Rajasthan                     | 50            | 42         | -                    | -         | -            | 22                            | 30            | 27         | -                    | -         | -            | 19                            |
| Uttar Pradesh                 | 60            | 60         | -                    | 4         | 4            | 44                            | 44            | 42         | -                    | 4         | 4            | 37                            |
| <b>Total (States covered)</b> | <b>408</b>    | <b>392</b> | <b>1</b>             | <b>25</b> | <b>27</b>    | <b>246</b>                    | <b>204</b>    | <b>193</b> | <b>2</b>             | <b>27</b> | <b>31</b>    | <b>165</b>                    |

Table 1 (b): (Concl'd.)

| State                         | B A R L E Y   |                |                      |           |                 |                                    | R A B I - J O W A R |                |                      |           |                 |                                    |
|-------------------------------|---------------|----------------|----------------------|-----------|-----------------|------------------------------------|---------------------|----------------|----------------------|-----------|-----------------|------------------------------------|
|                               | No. of Expts. |                | No. of Substitutions |           |                 | No. of central<br>driage<br>expts. | No. of Expts.       |                | No. of Substitutions |           |                 | No. of central<br>driage<br>expts. |
|                               | Planned       | Ins-<br>pected | Village              | Expts.    | Total<br>Expts. |                                    | Planned             | Ins-<br>pected | Village              | Expts.    | Total<br>Expts. |                                    |
| 1                             | 14            | 15             | 16                   | 17        | 18              | 19                                 | 20                  | 21             | 22                   | 23        | 24              | 25                                 |
| Andhra Pradesh                | -             | -              | -                    | -         | -               | -                                  | 60                  | 60             | -                    | 12        | 12              | 46                                 |
| Bihar                         | 30            | 26             | 1                    | 8         | 10              | 24                                 | -                   | -              | -                    | -         | -               | -                                  |
| Gujarat                       | -             | -              | -                    | -         | -               | -                                  | 20                  | 17             | -                    | 3         | 3               | 16                                 |
| Jammu & Kashmir               | -             | -              | -                    | -         | -               | -                                  | -                   | -              | -                    | -         | -               | -                                  |
| Madhya Pradesh                | 20            | 18             | -                    | -         | -               | 17                                 | -                   | -              | -                    | -         | -               | -                                  |
| Maharashtra                   | -             | -              | -                    | -         | -               | -                                  | 30                  | 28             | -                    | 4         | 4               | 23                                 |
| Mysore                        | -             | -              | -                    | -         | -               | -                                  | 60                  | 57             | -                    | 6         | 6               | 46                                 |
| Punjab                        | 40            | 36             | -                    | 1         | 1               | 26                                 | -                   | -              | -                    | -         | -               | -                                  |
| Rajasthan                     | 40            | 35             | -                    | -         | -               | 34                                 | -                   | -              | -                    | -         | -               | -                                  |
| Uttar Pradesh                 | 48            | 45             | -                    | 6         | 6               | 40                                 | -                   | -              | -                    | -         | -               | -                                  |
| <b>Total (States covered)</b> | <b>178</b>    | <b>160</b>     | <b>1</b>             | <b>15</b> | <b>17</b>       | <b>141</b>                         | <b>170</b>          | <b>162</b>     | <b>-</b>             | <b>25</b> | <b>25</b>       | <b>131</b>                         |

Classificatory analysis - GROSS YIELD RATES (in lbs/acre)  
Wet grain by States and categories, Kharif 1964-65.

| State           | R I C E        |                   |              |                |                    |               |               | K H A R I F J O W A R |                 |             |              |               |
|-----------------|----------------|-------------------|--------------|----------------|--------------------|---------------|---------------|-----------------------|-----------------|-------------|--------------|---------------|
|                 | Category 1     |                   | Category 2   |                | Category 3         |               |               | Category 2            |                 | Category 4  |              | Com-<br>bined |
|                 | Irri-<br>gated | Un-irri-<br>gated | Manured      | Not<br>manured | Impro-<br>ved seed | Local<br>seed | Com-<br>bined | Manured               | Not-<br>manured | Pure        | Mixed        |               |
| 1               | 2              | 3                 | 4            | 5              | 6                  | 7             | 8             | 9                     | 10              | 11          | 12           | 13            |
| Andhra Pradesh  | 1084<br>(35)   | 891<br>(1)        | 1112<br>(33) | 561<br>(3)     | 1219<br>(18)       | 903<br>(18)   | 1077<br>(36)  | 255<br>(7)            | 201<br>(19)     | 201<br>(11) | 225<br>(15)  | 215<br>(26)   |
| Assam           | 517<br>(2)     | 795<br>(34)       | 773<br>(4)   | 765<br>(32)    | 937<br>(2)         | 759<br>(31)   | 771<br>(36)   | -                     | -               | -           | -            | -             |
| Bihar           | 980<br>(6)     | 809<br>(56)       | 1045<br>(14) | 763<br>(48)    | 223<br>(2)         | 857<br>(60)   | 827<br>(62)   | -                     | -               | -           | -            | -             |
| Gujarat         | 1020<br>(2)    | 616<br>(17)       | 781<br>(12)  | 448<br>(7)     | 1017<br>(5)        | 531<br>(14)   | 659<br>(19)   | 328<br>(6)            | 130<br>(7)      | 151<br>(10) | 457<br>(3)   | 221<br>(13)   |
| Kerala          | 1600<br>(4)    | 1028<br>(39)      | 1034<br>(42) | 1267<br>(1)    | 1145<br>(14)       | 1053<br>(29)  | 1047<br>(43)  | -                     | -               | -           | -            | -             |
| Madhya Pradesh  | 759<br>(2)     | 517<br>(18)       | 689<br>(5)   | 519<br>(15)    | 561<br>(20)        | -             | 561<br>(20)   | 806<br>(4)            | 576<br>(34)     | 565<br>(8)  | 610<br>(30)  | 600<br>(38)   |
| Madras          | 1398<br>(32)   | 683<br>(6)        | 1296<br>(37) | 865<br>(1)     | 1199<br>(15)       | 1339<br>(23)  | 1284<br>(38)  | 616<br>(19)           | 334<br>(16)     | 543<br>(19) | 321<br>(16)  | 497<br>(35)   |
| Maharashtra     | 808<br>(3)     | 1039<br>(16)      | 1201<br>(10) | 781<br>(9)     | 1377<br>(4)        | 903<br>(15)   | 1003<br>(19)  | 981<br>(7)            | 429<br>(51)     | 580<br>(7)  | 485<br>(51)  | 496<br>(58)   |
| Mysore          | 1432<br>(6)    | 584<br>(12)       | 897<br>(17)  | 352<br>(1)     | 1466<br>(4)        | 695<br>(14)   | 867<br>(18)   | 609<br>(22)           | 238<br>(11)     | 1204<br>(4) | 386<br>(29)  | 486<br>(33)   |
| Orissa          | 1109<br>(9)    | 1063<br>(52)      | 1141<br>(48) | 673<br>(13)    | 881<br>(6)         | 1099<br>(55)  | 1071<br>(61)  | -                     | -               | -           | -            | -             |
| Punjab          | 960<br>(11)    | 1175<br>(7)       | 1333<br>(9)  | 753<br>(9)     | 1016<br>(5)        | 1054<br>(13)  | 1043<br>(18)  | -                     | -               | -           | -            | -             |
| Rajasthan       | -              | -                 | -            | -              | -                  | -             | -             | 40<br>(1)             | 266<br>(26)     | 220<br>(13) | 292<br>(14)  | 258<br>(27)   |
| Uttar Pradesh   | 833<br>(2)     | 629<br>(31)       | 676<br>(17)  | 603<br>(16)    | -                  | 641<br>(33)   | 641<br>(33)   | 284<br>(9)            | 522<br>(21)     | 495<br>(4)  | 444<br>(26)  | 451<br>(30)   |
| States covered. | 1018<br>(114)  | 787<br>(289)      | 970<br>(248) | 675<br>(155)   | 835<br>(95)        | 908<br>(308)  | 878<br>(403)  | 581<br>(75)           | 363<br>(185)    | 514<br>(76) | 431<br>(184) | 426<br>(260)  |

Table 2.1 (a) (Contd.)

| State            | B A J R A    |                      |              |              |               | M A I Z E      |                       |               |                      |              |             |               | R A G I        |                       |              |                      |             |             |               |
|------------------|--------------|----------------------|--------------|--------------|---------------|----------------|-----------------------|---------------|----------------------|--------------|-------------|---------------|----------------|-----------------------|--------------|----------------------|-------------|-------------|---------------|
|                  | Category-2   |                      | Category-4   |              | Com-<br>bined | Category-1     |                       | Category-2    |                      | Category-4   |             | Com-<br>bined | Category-1     |                       | Category-2   |                      | Category-4  |             | Com-<br>bined |
|                  | Manu-<br>red | Not-<br>manu-<br>red | Pure         | Mixed        |               | Irri-<br>gated | un-<br>irri-<br>gated | Manu-<br>red  | Not-<br>manu-<br>red | Pure         | Mixed       |               | Irri-<br>gated | un-<br>irri-<br>gated | Manu-<br>red | Not-<br>manu-<br>red | Pure        | Mixed       |               |
| 1                | 14           | 15                   | 16           | 17           | 18            | 19             | 20                    | 21            | 22                   | 23           | 24          | 25            | 26             | 27                    | 28           | 29                   | 30          | 31          | 32            |
| Andhra Pradesh   | 269<br>(11)  | 147<br>(18)          | 258<br>(15)  | 124<br>(14)  | 193<br>(29)   | -              | -                     | -             | -                    | -            | -           | -             | 1082<br>(7)    | 443<br>(21)           | 628<br>(18)  | 556<br>(10)          | 689<br>(21) | 340<br>(7)  | 602<br>(28)   |
| Bihar            | -            | -                    | -            | -            | -             | -              | 597<br>(48)           | 711<br>(15)   | 545<br>(33)          | 628<br>(40)  | 441<br>(8)  | 597<br>(48)   | -              | -                     | -            | -                    | -           | -           | -             |
| Gujarat          | 446<br>(19)  | 167<br>(13)          | 387<br>(23)  | 194<br>(9)   | 332<br>(32)   | 511<br>(2)     | 952<br>(18)           | 1017<br>(16)  | 472<br>(4)           | 1180<br>(8)  | 727<br>(12) | 908<br>(20)   | -              | -                     | -            | -                    | -           | -           | -             |
| Jammu & Kashmir  | -            | -                    | -            | -            | -             | 1592<br>(8)    | 770<br>(19)           | 1240<br>(20)  | 367<br>(7)           | 1034<br>(20) | 956<br>(7)  | 1014<br>(27)  | -              | -                     | -            | -                    | -           | -           | -             |
| Madhya Pradesh   | -            | -                    | -            | -            | -             | 1832<br>(2)    | 600<br>(28)           | 734<br>(12)   | 648<br>(18)          | 804<br>(21)  | 400<br>(9)  | 683<br>(30)   | -              | -                     | -            | -                    | -           | -           | -             |
| Madras           | 174<br>(10)  | 258<br>(19)          | 262<br>(23)  | 176<br>(6)   | 268<br>(29)   | -              | -                     | -             | -                    | -            | -           | -             | 1434<br>(9)    | 314<br>(10)           | 907<br>(13)  | 208<br>(6)           | 808<br>(11) | 806<br>(8)  | 823<br>(19)   |
| Maha-<br>rashtra | 303<br>(11)  | 108<br>(43)          | 236<br>(10)  | 128<br>(44)  | 148<br>(51)   | -              | -                     | -             | -                    | -            | -           | -             | -              | -                     | -            | -                    | -           | -           | -             |
| Mysore           | 143<br>(8)   | 97<br>(10)           | 118<br>(4)   | 118<br>(14)  | 118<br>(18)   | -              | -                     | -             | -                    | -            | -           | -             | -              | 564<br>(43)           | 609<br>(34)  | 395<br>(9)           | 673<br>(15) | 506<br>(28) | 564<br>(43)   |
| Punjab           | 346<br>(7)   | 203<br>(43)          | 246<br>(37)  | 157<br>(13)  | 223<br>(50)   | 1004<br>(9)    | 774<br>(30)           | 1108<br>(25)  | 324<br>(14)          | 780<br>(34)  | 1143<br>(5) | 827<br>(39)   | -              | -                     | -            | -                    | -           | -           | -             |
| Rajasthan        | 355<br>(3)   | 177<br>(44)          | 209<br>(38)  | 98<br>(9)    | 188<br>(47)   | 911<br>(4)     | 1256<br>(27)          | 1616<br>(13)  | 919<br>(18)          | 1348<br>(25) | 641<br>(6)  | 1211<br>(31)  | -              | -                     | -            | -                    | -           | -           | -             |
| Uttar            | 517<br>(18)  | 473<br>(18)          | 246<br>(6)   | 545<br>(30)  | 495<br>(36)   | 546<br>(1)     | 874<br>(42)           | 925<br>(34)   | 648<br>(9)           | 912<br>(29)  | 772<br>(14) | 866<br>(43)   | -              | -                     | -            | -                    | -           | -           | -             |
| States covered   | 349<br>(87)  | 194<br>(208)         | 241<br>(158) | 167<br>(139) | 231<br>(295)  | 967<br>(26)    | 832<br>(212)          | 1021<br>(135) | 600<br>(103)         | 917<br>(177) | 701<br>(61) | 852<br>(238)  | 1262<br>(16)   | 488<br>(74)           | 675<br>(65)  | 388<br>(25)          | 704<br>(47) | 536<br>(43) | 625<br>(90)   |

Table 2.1(b): Classificatory analysis - GROSS YIELD RATES (in lbs/acre) of dried grain by states and categories, Rabi 1964 - 65.

| State           | Wheat        |              |              |              |              |              |              |               |              |             |              |              |              |              |      |       |              |              |       |
|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|-------------|--------------|--------------|--------------|--------------|------|-------|--------------|--------------|-------|
|                 | Category 1   |              |              | Category 2   |              |              | Category 3   |               |              | Category 4  |              |              | Gram         |              |      |       |              |              |       |
|                 | Irrigated    | Un-irrigated | Mixed        | Un-irrigated | Un-irrigated | Un-irrigated | Local seed   | Improved seed | Mixed        | Pure        | Mixed        | Un-irrigated | Un-irrigated | Mixed        | Pure | Mixed | Un-irrigated | Un-irrigated | Mixed |
|                 | 2            | 3            | 4            | 5            | 6            | 7            | 8            | 9             | 10           | 11          | 12           | 13           | 14           | 15           | 16   | 17    | 18           | 19           | 20    |
| Bihar           | 507<br>(16)  | 331<br>(34)  | 586<br>(17)  | 350<br>(33)  | 439<br>(1)   | 428<br>(49)  | 426<br>(29)  | 339<br>(21)   | 430<br>(50)  | 330<br>(3)  | 324<br>(27)  | 441<br>(15)  | 309<br>(15)  | 375<br>(30)  |      |       |              |              |       |
| Guj             | 1187<br>(25) | 421<br>(21)  | 716<br>(30)  | 670<br>(16)  | 1092<br>(12) | 658<br>(27)  | 866<br>(44)  | 218<br>(2)    | 837<br>(46)  | -           | -            | -            | -            | -            |      |       |              |              |       |
| Jammu & Kashmir | 589<br>(4)   | 518<br>(14)  | 631<br>(9)   | 437<br>(9)   | 552<br>(1)   | 532<br>(17)  | 543<br>(12)  | 515<br>(6)    | 533<br>(18)  | -           | -            | -            | -            | -            |      |       |              |              |       |
| Madhya Pradesh  | 558<br>(1)   | 410<br>(39)  | 468<br>(3)   | 410<br>(37)  | 331<br>(1)   | 416<br>(39)  | 424<br>(20)  | 404<br>(20)   | 414<br>(40)  | 177<br>(1)  | 217<br>(33)  | 3531<br>(15) | 107<br>(19)  | 216<br>(34)  |      |       |              |              |       |
| Maharashtra     | 718<br>(22)  | 472<br>(26)  | 666<br>(19)  | 532<br>(26)  | 436<br>(6)   | 606<br>(42)  | 597<br>(41)  | 515<br>(7)    | 584<br>(48)  | 358<br>(6)  | 426<br>(11)  | 434<br>(14)  | 349<br>(6)   | 406<br>(20)  |      |       |              |              | 38    |
| Mysore          | 646<br>(2)   | 234<br>(28)  | 258<br>(5)   | 262<br>(25)  | 263<br>(1)   | 261<br>(29)  | 461<br>(4)   | 231<br>(26)   | 261<br>(30)  | -           | -            | -            | -            | -            |      |       |              |              |       |
| Punjab          | 961<br>(25)  | 826<br>(33)  | 1093<br>(16) | 804<br>(42)  | 1030<br>(22) | 748<br>(30)  | 919<br>(37)  | 822<br>(21)   | 824<br>(58)  | 663<br>(9)  | 575<br>(31)  | 809<br>(21)  | 358<br>(19)  | 594<br>(40)  |      |       |              |              |       |
| Rajasthan       | 305<br>(29)  | 330<br>(13)  | 869<br>(14)  | 553<br>(28)  | 1590<br>(1)  | 636<br>(41)  | 850<br>(25)  | 378<br>(17)   | 658<br>(42)  | 434<br>(1)  | 196<br>(26)  | 237<br>(17)  | 151<br>(10)  | 204<br>(27)  |      |       |              |              |       |
| Uttar Pradesh   | 980<br>(31)  | 529<br>(26)  | 997<br>(20)  | 678<br>(40)  | 1026<br>(24) | 624<br>(36)  | 817<br>(12)  | 771<br>(42)   | 785<br>(60)  | 234<br>(9)  | 260<br>(33)  | 321<br>(9)   | 236<br>(33)  | 254<br>(42)  |      |       |              |              |       |
| States covered  | 808<br>(158) | 514<br>(234) | 804<br>(133) | 584<br>(259) | 814<br>(82)  | 576<br>(310) | 699<br>(230) | 582<br>(162)  | 654<br>(392) | 407<br>(29) | 332<br>(164) | 447<br>(91)  | 239<br>(102) | 338<br>(193) |      |       |              |              |       |

Table 2.1(b) (Contd.)

| State          | Barley         |                       |             |                     |              |             |               | Rabi-Jowar   |                |              |             |               |
|----------------|----------------|-----------------------|-------------|---------------------|--------------|-------------|---------------|--------------|----------------|--------------|-------------|---------------|
|                | Category 1     |                       | Category 2  |                     | Category 4   |             | Com-<br>bined | Category 2   |                | Category 4   |             | Com-<br>bined |
|                | Irri-<br>gated | Un-<br>irri-<br>gated | Manured     | Not<br>man-<br>ured | Pure         | Mixed       |               | Manured      | Not<br>Manured | Pure         | Mixed       |               |
| 1              | 16             | 17                    | 18          | 19                  | 20           | 21          | 22            | 23           | 24             | 25           | 26          | 27            |
| Andhra Pradesh | -              | -                     | -           | -                   | -            | -           | -             | 268<br>(22)  | 272<br>(38)    | 266<br>(51)  | 297<br>(9)  | 270<br>(60)   |
| Bihar          | 477<br>(5)     | 272<br>(21)           | 276<br>(8)  | 326<br>(15)         | 337<br>(11)  | 292<br>(15) | 311<br>(26)   | -            | -              | -            | -           | -             |
| Gujarat        | -              | -                     | -           | -                   | -            | -           | -             | 834<br>(12)  | 770<br>(5)     | 905<br>(15)  | 446<br>(2)  | 851<br>(17)   |
| Madhya Pradesh | -              | 334<br>(13)           | 407<br>(2)  | 325<br>(16)         | 454<br>(5)   | 283<br>(13) | 334<br>(13)   | -            | -              | -            | -           | -             |
| Maharashtra    | -              | -                     | -           | -                   | -            | -           | -             | 1522<br>(3)  | 346<br>(25)    | 321<br>(14)  | 621<br>(14) | 471<br>(28)   |
| Mysore         | -              | -                     | -           | -                   | -            | -           | -             | 635<br>(18)  | 417<br>(39)    | 493<br>(28)  | 430<br>(29) | 486<br>(57)   |
| Punjab         | 1214<br>(15)   | 831<br>(21)           | 1528<br>(7) | 861<br>(29)         | 1095<br>(23) | 306<br>(13) | 991<br>(36)   | -            | -              | -            | -           | -             |
| Rajasthan      | 834<br>(26)    | 136<br>(9)            | 955<br>(14) | 516<br>(21)         | 834<br>(15)  | 547<br>(20) | 692<br>(35)   | -            | -              | -            | -           | -             |
| Uttar Pradesh  | 926<br>(21)    | 570<br>(24)           | 953<br>(13) | 592<br>(27)         | 742<br>(24)  | 730<br>(21) | 736<br>(45)   | -            | -              | -            | -           | -             |
| States Covered | 870<br>(67)    | 460<br>(93)           | 855<br>(49) | 540<br>(111)        | 708<br>(78)  | 616<br>(82) | 658<br>(160)  | 1045<br>(55) | 361<br>(107)   | 369<br>(103) | 519<br>(54) | 447<br>(162)  |

20. Classificatory analysis - NET FIELD YIELDS (in lbs./acre)  
of dried grain by states and categories, Kharif 1961-65.

| State             | Rice           |                    |              |                  |                         |               |               | Kharif-Jowar |                |             |              |               |
|-------------------|----------------|--------------------|--------------|------------------|-------------------------|---------------|---------------|--------------|----------------|-------------|--------------|---------------|
|                   | Category 1     |                    | Category 2   |                  | Category 3              |               | Com-<br>bined | Category 2   |                | Category 1  |              | Com-<br>bined |
|                   | Irri-<br>gated | Non-irri-<br>gated | Man-<br>ured | Not man-<br>ured | Impr-<br>ov-<br>ed seed | Local<br>seed |               | Manured      | Not<br>manured | Pure        | Mixed        |               |
| 1                 | 2              | 3                  | 4            | 5                | 6                       | 7             | 8             | 9            | 10             | 11          | 12           | 13            |
| Andhra Pradesh    | 1084<br>(35)   | 893<br>(1)         | 1112<br>(33) | 561<br>(3)       | 1219<br>(12)            | 903<br>(12)   | 1077<br>(36)  | 377<br>(7)   | 237<br>(19)    | 201<br>(11) | 308<br>(15)  | 275<br>(26)   |
| Assam             | 517<br>(2)     | 807<br>(34)        | 773<br>(4)   | 772<br>(32)      | 937<br>(2)              | 773<br>(34)   | 733<br>(36)   | -            | -              | -           | -            | -             |
| Bihar             | 920<br>(6)     | 807<br>(56)        | 1045<br>(14) | 763<br>(42)      | 223<br>(2)              | 857<br>(60)   | 827<br>(62)   | -            | -              | -           | -            | -             |
| Gujarat           | 1020<br>(2)    | 637<br>(17)        | 809<br>(12)  | 451<br>(7)       | 1022<br>(5)             | 554<br>(14)   | 677<br>(19)   | 348<br>(6)   | 133<br>(7)     | 151<br>(10) | 518<br>(3)   | 235<br>(13)   |
| Kerala            | 1600<br>(4)    | 1028<br>(30)       | 1036<br>(42) | 1267<br>(1)      | 1145<br>(14)            | 1053<br>(22)  | 1047<br>(43)  | -            | -              | -           | -            | -             |
| Madhya Pradesh    | 759<br>(2)     | 523<br>(12)        | 689<br>(5)   | 523<br>(15)      | 565<br>(20)             | -             | 565<br>(20)   | 1142<br>(4)  | 826<br>(34)    | 565<br>(8)  | 938<br>(30)  | 859<br>(38)   |
| Madhya Pradesh    | 1398<br>(32)   | 683<br>(6)         | 1298<br>(37) | 865<br>(1)       | 1199<br>(15)            | 1339<br>(23)  | 1234<br>(38)  | 632<br>(19)  | 370<br>(16)    | 543<br>(19) | 368<br>(16)  | 523<br>(35)   |
| Madhya Pradesh    | 808<br>(3)     | 1042<br>(16)       | 1201<br>(10) | 737<br>(9)       | 1377<br>(4)             | 906<br>(15)   | 1005<br>(19)  | 1672<br>(7)  | 605<br>(51)    | 580<br>(7)  | 755<br>(51)  | 734<br>(53)   |
| Mysore            | 1432<br>(6)    | 591<br>(12)        | 902<br>(17)  | 352<br>(1)       | 1466<br>(4)             | 701<br>(14)   | 871<br>(18)   | 888<br>(22)  | 292<br>(11)    | 1204<br>(4) | 619<br>(29)  | 690<br>(33)   |
| Orissa            | 1109<br>(9)    | 1063<br>(52)       | 1141<br>(42) | 673<br>(13)      | 881<br>(6)              | 1099<br>(55)  | 1071<br>(61)  | -            | -              | -           | -            | -             |
| Punjab            | 960<br>(11)    | 1175<br>(7)        | 1333<br>(9)  | 753<br>(9)       | 1016<br>(5)             | 1054<br>(13)  | 1043<br>(13)  | -            | -              | -           | -            | -             |
| Rajasthan         | -              | -                  | -            | -                | -                       | -             | -             | 53<br>(1)    | 294<br>(26)    | 220<br>(13) | 345<br>(14)  | 285<br>(27)   |
| Uttar Pradesh     | 833<br>(2)     | 629<br>(31)        | 676<br>(17)  | 603<br>(16)      | -                       | 643<br>(33)   | 641<br>(33)   | 573<br>(9)   | 672<br>(21)    | 495<br>(4)  | 665<br>(26)  | 643<br>(30)   |
| All India covered | 1018<br>(114)  | 789<br>(289)       | 971<br>(248) | 677<br>(155)     | 835<br>(95)             | 910<br>(308)  | 880<br>(403)  | 878<br>(75)  | 479<br>(125)   | 514<br>(76) | 624<br>(184) | 582<br>(260)  |



Table B.2(a)(Contd.)

| State             | Bajra        |                     |              |              |               | Maize          |                       |               |                     |              |              |               | Ragi           |                       |              |                     |             |             |               |
|-------------------|--------------|---------------------|--------------|--------------|---------------|----------------|-----------------------|---------------|---------------------|--------------|--------------|---------------|----------------|-----------------------|--------------|---------------------|-------------|-------------|---------------|
|                   | Category 2   |                     | Category 1   |              | Com-<br>bined | Category 1     |                       | Category 2    |                     | Category 4   |              | Com-<br>bined | Category 1     |                       | Category 2   |                     | Category 4  |             | Com-<br>bined |
|                   | Man-<br>ured | Not<br>man-<br>ured | Pure         | Mixed        |               | Irri-<br>gated | Un-<br>irri-<br>gated | Man-<br>ured  | Not<br>man-<br>ured | Pure         | Mixed        |               | Irri-<br>gated | Un-<br>irri-<br>gated | Man-<br>ured | Not<br>man-<br>ured | Pure        | Mixed       |               |
| 1                 | 16           | 17                  | 18           | 19           | 20            | 21             | 22                    | 23            | 24                  | 25           | 26           | 27            | 28             | 29                    | 30           | 31                  | 32          | 33          | 34            |
| Andhra Pradesh    | 339<br>(11)  | 155<br>(18)         | 258<br>(15)  | 190<br>(14)  | 225<br>(29)   | -              | -                     | -             | -                   | -            | -            | -             | 1082<br>(7)    | 469<br>(21)           | 656<br>(18)  | 561<br>(10)         | 689<br>(21) | 419<br>(7)  | 622<br>(29)   |
| Bihar             | -            | -                   | -            | -            | -             | -              | 618<br>(48)           | 742<br>(15)   | 561<br>(33)         | 628<br>(40)  | 566<br>(8)   | 618<br>(48)   | -              | -                     | -            | -                   | -           | -           | -             |
| Gujarat           | 450<br>(19)  | 180<br>(13)         | 387<br>(23)  | 220<br>(9)   | 340<br>(32)   | 1220<br>(2)    | 1197<br>(13)          | 1282<br>(16)  | 872<br>(4)          | 1180<br>(2)  | 1213<br>(12) | 1200<br>(20)  | -              | -                     | -            | -                   | -           | -           | -             |
| Jammu & Kashmir   | -            | -                   | -            | -            | -             | 1604<br>(8)    | 860<br>(19)           | 1299<br>(20)  | 458<br>(7)          | 1034<br>(20) | 1214<br>(7)  | 1081<br>(27)  | -              | -                     | -            | -                   | -           | -           | -             |
| Madhya Pradesh    | -            | -                   | -            | -            | -             | 1832<br>(2)    | 740<br>(28)           | 774<br>(12)   | 839<br>(18)         | 804<br>(21)  | 834<br>(9)   | 813<br>(30)   | -              | -                     | -            | -                   | -           | -           | -             |
| Madras            | 175<br>(10)  | 264<br>(19)         | 262<br>(23)  | 194<br>(6)   | 273<br>(29)   | -              | -                     | -             | -                   | -            | -            | -             | 1499<br>(9)    | 341<br>(10)           | 969<br>(13)  | 217<br>(6)          | 808<br>(11) | 1096<br>(8) | 867<br>(19)   |
| Maha-<br>rashtra  | 335<br>(11)  | 131<br>(43)         | 236<br>(10)  | 158<br>(44)  | 173<br>(54)   | -              | -                     | -             | -                   | -            | -            | -             | -              | -                     | -            | -                   | -           | -           | -             |
| Mysore            | 259<br>(8)   | 169<br>(10)         | 118<br>(4)   | 235<br>(14)  | 209<br>(18)   | -              | -                     | -             | -                   | -            | -            | -             | -              | 652<br>(43)           | 704<br>(34)  | 457<br>(9)          | 673<br>(15) | 640<br>(28) | 652<br>(43)   |
| Punjab            | 382<br>(7)   | 254<br>(43)         | 246<br>(37)  | 348<br>(13)  | 273<br>(50)   | 1014<br>(9)    | 796<br>(30)           | 1121<br>(25)  | 355<br>(14)         | 780<br>(34)  | 1296<br>(5)  | 846<br>(39)   | -              | -                     | -            | -                   | -           | -           | -             |
| Rajasthan         | 355<br>(3)   | 193<br>(44)         | 209<br>(38)  | 177<br>(9)   | 203<br>(47)   | 994<br>(4)     | 1333<br>(27)          | 1616<br>(13)  | 1053<br>(18)        | 1048<br>(25) | 1042<br>(6)  | 1289<br>(31)  | -              | -                     | -            | -                   | -           | -           | -             |
| Uttar<br>Pradesh  | 801<br>(18)  | 959<br>(18)         | 246<br>(6)   | 1007<br>(30) | 880<br>(36)   | 723<br>(1)     | 929<br>(42)           | 970<br>(34)   | 750<br>(9)          | 912<br>(29)  | 949<br>(14)  | 924<br>(43)   | -              | -                     | -            | -                   | -           | -           | -             |
| States<br>covered | 394<br>(87)  | 260<br>(208)        | 241<br>(156) | 276<br>(139) | 289<br>(295)  | 1094<br>(26)   | 902<br>(212)          | 1064<br>(135) | 706<br>(103)        | 917<br>(177) | 953<br>(61)  | 922<br>(238)  | 1296<br>(16)   | 551<br>(74)           | 750<br>(65)  | 428<br>(25)         | 704<br>(47) | 691<br>(43) | 691<br>(90)   |

Table 3.2(b): Classificatory analysis - NET YIELD RATES (in lbs/acre)  
of dried grain by states and categories, Rabi 1964-65

| 1              | Wheat          |                       |              |                     |                       |               |              |                  |               | Gram           |                       |             |              |               |
|----------------|----------------|-----------------------|--------------|---------------------|-----------------------|---------------|--------------|------------------|---------------|----------------|-----------------------|-------------|--------------|---------------|
|                | Category 1     |                       | Category 2   |                     | Category 3            |               | Category 4   |                  | Com-<br>bined | Category 1     |                       | Category 4  |              | Com-<br>bined |
|                | Irri-<br>gated | Un-<br>irri-<br>gated | Man-<br>ured | Not<br>man-<br>ured | Imp-<br>roved<br>seed | Local<br>seed | Pure         | Mix <sup>d</sup> |               | Irri-<br>gated | Un-<br>irri-<br>gated | Pure        | Mixed        |               |
| 2              | 3              | 4                     | 5            | 6                   | 7                     | 8             | 9            | 10               | 11            | 12             | 13                    | 14          | 15           |               |
| Bihar          | 544<br>(16)    | 629<br>(34)           | 633<br>(17)  | 586<br>(33)         | 489<br>(1)            | 605<br>(49)   | 496<br>(29)  | 748<br>(21)      | 602<br>(50)   | 910<br>(3)     | 501<br>(27)           | 441<br>(15) | 643<br>(15)  | 512<br>(30)   |
| Gujarat        | 1187<br>(25)   | 424<br>(21)           | 916<br>(30)  | 694<br>(16)         | 1092<br>(12)          | 660<br>(27)   | 866<br>(44)  | 249<br>(2)       | 839<br>(46)   | -              | -                     | -           | -            | -             |
| & Kasl         | 589<br>(4)     | 529<br>(14)           | 635<br>(9)   | 449<br>(9)          | 552<br>(1)            | 542<br>(17)   | 543<br>(12)  | 542<br>(6)       | 542<br>(13)   | -              | -                     | -           | -            | -             |
| Madhya Pradesh | 558<br>(1)     | 535<br>(39)           | 468<br>(3)   | 541<br>(37)         | 331<br>(1)            | 541<br>(39)   | 424<br>(20)  | 647<br>(20)      | 535<br>(40)   | 443<br>(1)     | 300<br>(33)           | 353<br>(15) | 267<br>(19)  | 305<br>(34)   |
| Maharashtra    | 751<br>(22)    | 485<br>(26)           | 705<br>(19)  | 543<br>(29)         | 437<br>(6)            | 631<br>(42)   | 597<br>(41)  | 668<br>(7)       | 607<br>(48)   | 358<br>(6)     | 439<br>(14)           | 434<br>(14) | 369<br>(6)   | 414<br>(20)   |
| Mysore         | 646<br>(2)     | 261<br>(28)           | 285<br>(5)   | 287<br>(25)         | 309<br>(1)            | 286<br>(29)   | 461<br>(4)   | 260<br>(26)      | 287<br>(30)   | -              | -                     | -           | -            | -             |
| Punjab         | 1052<br>(25)   | 1128<br>(33)          | 1249<br>(16) | 1037<br>(42)        | 1302<br>(22)          | 902<br>(30)   | 919<br>(37)  | 1406<br>(21)     | 1095<br>(58)  | 820<br>(9)     | 764<br>(31)           | 809<br>(21) | 741<br>(19)  | 776<br>(40)   |
| Rajasthan      | 934<br>(29)    | 426<br>(13)           | 1000<br>(14) | 665<br>(28)         | 1590<br>(1)           | 757<br>(41)   | 850<br>(25)  | 669<br>(17)      | 777<br>(42)   | 434<br>(1)     | 218<br>(26)           | 237<br>(17) | 209<br>(10)  | 226<br>(27)   |
| Uttar Pradesh  | 1156<br>(34)   | 655<br>(26)           | 1113<br>(20) | 851<br>(40)         | 1154<br>(24)          | 794<br>(36)   | 817<br>(18)  | 990<br>(42)      | 939<br>(60)   | 440<br>(9)     | 387<br>(33)           | 321<br>(9)  | 420<br>(33)  | 398<br>(42)   |
| States covered | 893<br>(158)   | 659<br>(234)          | 884<br>(133) | 733<br>(259)        | 901<br>(82)           | 707<br>(310)  | 699<br>(230) | 871<br>(162)     | 789<br>(392)  | 559<br>(29)    | 447<br>(164)          | 447<br>(91) | 449<br>(102) | 457<br>(193)  |

Table 2.2 (b) (Contd.)

| State            | Barley         |                  |              |                 |              |              |               | Rabi - Jowar |                 |              |             |               |
|------------------|----------------|------------------|--------------|-----------------|--------------|--------------|---------------|--------------|-----------------|--------------|-------------|---------------|
|                  | Category-1     |                  | Category-2   |                 | Category-3   |              | Com-<br>bined | Category-2   |                 | Category-4   |             | Com-<br>bined |
|                  | Irri-<br>gated | Un-<br>irrigated | Manured      | Not-<br>manured | Pure         | Mixed        |               | Manured      | Not-<br>manured | Pure         | Mixed       |               |
| 1                | 15             | 17               | 18           | 19              | 20           | 21           | 22            | 23           | 24              | 25           | 26          | 27            |
| Andhra Pradesh   | -              | -                | -            | -               | -            | -            | -             | 278<br>(22)  | 273<br>(33)     | 266<br>(51)  | 351<br>(9)  | 278<br>(60)   |
| Bihar            | 562<br>(5)     | 349<br>(21)      | 383<br>(3)   | 391<br>(13)     | 337<br>(11)  | 430<br>(15)  | 390<br>(26)   | -            | -               | -            | -           | -             |
| Gujarat          | -              | -                | -            | -               | -            | -            | -             | 384<br>(12)  | 397<br>(5)      | 905<br>(15)  | 753<br>(2)  | 338<br>(17)   |
| Madhya Pradesh   | -              | 499<br>(18)      | 407<br>(12)  | 511<br>(15)     | 454<br>(5)   | 517<br>(13)  | 499<br>(18)   | -            | -               | -            | -           | -             |
| Maharashtra      | -              | -                | -            | -               | -            | -            | -             | 1564<br>(3)  | 387<br>(25)     | 321<br>(14)  | 704<br>(14) | 513<br>(28)   |
| Mysore           | -              | -                | -            | -               | -            | -            | -             | 672<br>(18)  | 530<br>(39)     | 493<br>(23)  | 654<br>(29) | 575<br>(57)   |
| Punjab           | 1395<br>(15)   | 913<br>(21)      | 1528<br>(7)  | 1013<br>(29)    | 1095<br>(23) | 1154<br>(13) | 1117<br>(33)  | -            | -               | -            | -           | -             |
| Rajasthan        | 1063<br>(26)   | 290<br>(9)       | 1061<br>(14) | 733<br>(21)     | 334<br>(15)  | 849<br>(20)  | 364<br>(35)   | -            | -               | -            | -           | -             |
| Uttar Pradesh    | 1078<br>(21)   | 701<br>(24)      | 1003<br>(18) | 793<br>(27)     | 742<br>(24)  | 1032<br>(21) | 377<br>(45)   | -            | -               | -            | -           | -             |
| States covered:- | 1018<br>(37)   | 537<br>(93)      | 916<br>(49)  | 722<br>(111)    | 703<br>(73)  | 894<br>(82)  | 796<br>(160)  | 1079<br>(55) | 416<br>(107)    | 369<br>(103) | 625<br>(54) | 494<br>(162)  |

A P P E N D I X 1

Statement giving shape and size of plots adopted for crop estimation surveys in different States and agencies for field work for the States and crops covered by the harvest state inspection programme

| State           | Agency for field work                     | Crops covered  | Shape of plot         | Size   |
|-----------------|---|--|-----------------------|--|
| 1               | 2   | 3  | 4                     | 5  |
| Andhra Pradesh  | Revenue and Agriculture                   | Paddy, Kh.Jowar, Bajra, Ragi and Rabi Jowar.         | Rect.                 | 1/100 acre<br>(50 links x 20 links)  |
| Assam           | Special (Statistical) staff               | Paddy  | Square                | 1/160 acre<br>(16½' x 16½')  |
| Bihar           | Revenue and Development                   | Paddy, Maize, Wheat, Gram and Barley                 | Rect.                 | 1/80 acre<br>(33' x 16½')  |
| Gujarat         | Revenue and Development                   | Paddy, Kh.Jowar, Bajra, Maize, Wheat and Rabi Jowar. | Square                | (1/40 acre<br>(33' x 33')  |
| Jammu & Kashmir | Revenue                                   | Maize and Wheat                                      | Rect.                 | 1/80 acre<br>(33' x 16½')  |
| Kerala          | Special (Statistical) Staff               | Paddy  | Square                | 1/160 acre<br>(16½' x 16½')  |
| Madhya Pradesh  | Revenue                                   | Paddy, Jowar, Maize, Wheat, Gram and Barley          | Rect.                 | 1/80 acre<br>33' x 16½')   |
| Madras          | Revenue and Agriculture                   | Paddy, Jowar, Bajra and Ragi                         | Rect.                 | 1/100 acre<br>(50 links x 20 links)  |
| Maharashtra     | Revenue                                   | Paddy, Jowar, Bajra, Wheat, Gram and Rabi Jowar      | Square                | 1/40.5 acre<br>(10 metres x 10 metres)                                       |
| Mysore          | Revenue and Agriculture                   | Paddy, Kh.Jowar, Bajra, Ragi, Wheat and Rabi Jowar.  | Rect.                 | 1/80.9 acre<br>(10 metres x 5 metres)  |
| Orissa          | Special Staff-Amin (Deptt. of Statistics) | Paddy  | Circle                | 1/365.3 of an acre (cut of 4' radius)  |
| Punjab          | Revenue and Agriculture                   | Paddy, Bajra, Maize, Wheat, Gram and Barley          | Rect.                 | 1/80 acre<br>(33' x 16½');<br>1 of an acre<br>135<br>(10mx3m) in hilly areas |
| Rajasthan       | Revenue                                   | Jowar, Bajra, Maize, Wheat, Gram and Barley          | Rect.                 | 1/30 acre<br>(33' x 16½')  |
| Uttar Pradesh   | Revenue                                   | Paddy, Jowar, Bajra, Maize, Wheat, Gram and Barley   | Equi-lateral triangle | 1/93.4 acre<br>(Each side 10 metres)   |

APPENDIX IICentral Driage Experiments, 1964-65

1. The Directorate of NSS initiated the programme of central driage experiments in 1960-61 on a small scale at the Headquarters (New Delhi). This established the feasibility of carrying out central driage operations at a suitable central place. The central driage experiments were taken up on regular basis from 1961-62 so that driage ratios calculated from them could be readily available for obtaining yield rates in terms of dried grain from the data of experiments inspected under the harvest-stage inspection programme for which weights of the green produce had been reported by the supervisors.

2. Scale of work:- During 1964-65, the supervisors were required to conduct circular cut (of 4' ~~radii~~), experiments with the ISI instruments in some of the fields selected for harvest stage inspection. They were asked to mail to the headquarters the entire produce (including border plants) obtained from each of the circular cuts for the purpose of central driage experiments at Delhi. The produce was received for a total of 1013 experiments in kharif season and 713 experiments in Rabi season. Of these, 60 in kharif (out of 1013) and 30 in Rabi (out of 713) were rejected on account of damage in transit or otherwise not conforming to requirements.

3. Procedure for despatch of bags:- The produce for driage experiments at Delhi had to be properly sealed in a cloth bag of white drill and mailed as a Registered parcel. The contents of the produce consisted of cobs/earheads for jowar, bajra, maize and ragi and grain for paddy, wheat, gram and barley.

4. Driage procedure followed at headquarters:- The procedure followed for the conduct of these experiments at the headquarters is indicated below:-

- (i) Examination of the contents and taking weight to the nearest 5 grams as soon as the bag was received. The weight of the empty bag was also noted.
- (ii) The produce was thereafter put in the bag and the closed bag was exposed to the sun daily (excluding rainy days and holidays). The bag was exposed till a constant weight was attained in three consecutive weightments. Weightments were taken on alternate days.
- (iii) When constancy had been attained the bag was opened and the weight of dried produce noted.
- (iv) In the case of cobs/ear-heads, the produce was threshed and cleaned. The cleaned grain was again exposed to the sun till its weight became steady.

5. Arrangements for storage and driage:- For the purpose of storing the bags, a steel Godrej rack covered with a frame of wire netting was kept in a closed verandah. This protected the produce from any possible damage from rats etc. The bags were exposed to the sun daily by placing them on a tarpaulin and covered with hen-coop-like frame of wire netting. This arrangement kept the produce free from damage by birds etc. and at the same time obviated the necessity for a whole-time worker to keep watch on them. The weights were taken with the help of a counter-balance, which considerably quickened the weighing operations.

6. Results: Table A.II enclosed gives state-wise and crop-wise driage ratios used for this report together with the source of information.

Table A.II;

Crop-wise driage ratios used alongwith the source, harvest stage inspection 1964-65

| State           | Kharif - Food crops |            |              |            |              |            |              |            |              |            |
|-----------------|---------------------|------------|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
|                 | Paddy               |            | Jowar        |            | Bajra        |            | Maize        |            | Ragi         |            |
|                 | Driage ratio        | Source     | Driage ratio | Source     | Driage ratio | Source     | Driage ratio | Source     | Driage ratio | Source     |
| 1               | 2                   | 3          | 4            | 5          | 6            | 7          | 8            | 9          | 10           | 11         |
| Andhra Pradesh  | 0.3849              | CDE(64-65) | 0.5123       | CDE(64-65) | 0.5044       | CDE(64-65) | -            | -          | 0.5040       | CDE(64-65) |
| Assam           | 0.3270              | "          | -            | -          | -            | -          | -            | -          | -            | -          |
| Bihar           | 0.3553              | "          | -            | -          | -            | -          | 0.4139       | CDE(64-65) | -            | -          |
| Gujarat         | 0.3989              | "          | 0.4208       | CDE(64-65) | 0.5324       | CDE(64-65) | 0.4865       | "          | -            | -          |
| Jammu & Kashmir | -                   | -          | -            | -          | -            | -          | 0.4855       | "          | -            | -          |
| Kerala          | 0.3420              | CDE(64-65) | -            | -          | -            | -          | -            | -          | -            | -          |
| Madhya Pradesh  | 0.3578              | "          | 0.5203       | CDE(64-65) | -            | -          | 0.4511       | CDE(64-65) | -            | -          |
| Madras          | 0.8231              | "          | 0.5726       | "          | 0.5425       | CDE(64-65) | -            | -          | 0.4305       | CDE(64-65) |
| Maharashtra     | 0.3575              | "          | 0.6014       | "          | 0.5165       | "          | -            | -          | -            | -          |
| Mysore          | 0.3926              | "          | 0.5336       | "          | 0.4733       | "          | -            | -          | 0.5067       | CDE(64-65) |
| Orissa          | 0.3387              | CDE(63-64) | -            | -          | -            | -          | -            | -          | -            | -          |
| Punjab          | 0.8355              | CDE(64-65) | -            | -          | 0.4627       | CDE(64-65) | 0.3654       | CDE(64-65) | -            | -          |
| Rajasthan       | -                   | -          | 0.5221       | CDE(64-65) | 0.5474       | "          | 0.5812       | "          | -            | -          |
| Uttar Pradesh   | 0.3623              | CDE(64-65) | 0.5351       | "          | 0.5015       | "          | 0.4411       | "          | -            | -          |

Table A.II; (Contd.)

| State           | Rabi - Food crops |            |               |            |               |            |               |            |
|-----------------|-------------------|------------|---------------|------------|---------------|------------|---------------|------------|
|                 | Wheat             |            | Gram          |            | Barley        |            | R. Jowar      |            |
|                 | Drriage ratio     | Source     | Drriage ratio | Source     | Drriage ratio | Source     | Drriage ratio | Source     |
| 1               | 12                | 13         | 14            | 15         | 16            | 17         | 18            | 19         |
| Andhra Pradesh  | -                 | -          | -             | -          | -             | -          | 0.6242        | CDE(64-65) |
| Bihar           | 0.9135            | CDE(64-65) | 0.9030        | CDE(64-65) | 0.8541        | CDE(64-65) | -             | -          |
| Gujarat         | 0.9349            | "          | -             | -          | -             | -          | 0.6000        | CDE(64-65) |
| Jammu & Kashmir | 0.8644            | "          | -             | -          | -             | -          | -             | -          |
| Madhya Pradesh  | 0.9378            | CDE(64-65) | 0.3730        | CDE(64-65) | 0.3226        | CDE(64-65) | -             | -          |
| Maharashtra     | 0.9486            | CDE(64-65) | 0.3706        | CDE(64-65) | -             | -          | 0.5856        | CDE(64-65) |
| Mysore          | 0.3351            | "          | -             | -          | -             | -          | 0.5977        | "          |
| Punjab          | 0.3534            | CDE(64-65) | 0.3924        | CDE(64-65) | 0.3806        | CDE(64-65) | -             | -          |
| Rajasthan       | 0.9683            | "          | 0.9207        | CDE(64-65) | 0.9114        | "          | -             | -          |
| Uttar Pradesh   | 0.9018            | "          | 0.9050        | CDE(64-65) | 0.9097        | "          | -             | -          |



## B. Surveys for Estimation of Crop Areas

### B.I. *Sample surveys for pre-harvest (advance) estimates of crop acreages*

- B.1.1. . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1955-56.
- B.1.2. . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1956-57 and 1957-58.
- B.1.3. . . . Report on the sample check of field work of the sample survey for pre-harvest (advance) estimates of crop acreages, 1957-58.
- B.1.4. . . . Report on the sample survey for pre-harvest (advance) estimates of crop acreages, 1958-59.
- B.1.5. . . . Review of sample surveys for pre-harvest (advance) estimates of crop acreages, 1953-54 to 1959-60.

### B.2. *Studies on crop areas*

- B.2.1. . . . Report on some aspects of enumeration and compilation of crop areas in the States.

## C. Surveys in Development Areas

### C.I. *Crop estimation surveys*

- C.1.1. . . . Report on the crop estimation survey in development areas, Rabi, 1954-55.
- C.1.2. . . . Report on the crop estimation survey in development areas, 1955-56.
- C.1.3. . . . Report on the crop estimation survey in development areas, 1956-57.
- C.1.4. . . . Report on the crop estimation survey in development areas, 1957-58.
- C.1.5. . . . Report on the crop estimation survey in development areas, Kharif, 1958-59.
- C.1.6. . . . Report on the crop estimation survey in development areas, Rabi, 1958-59.
- C.1.7. . . . Report on the crop estimation survey in development areas, 1959-60.
- C.1.8. . . . Review of crop estimation surveys in development areas, 1955-56 to 1959-60.

### C.2. *Estimation of area brought under improved agricultural practices*

- C.2.1. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Andhra Pradesh, Kharif, 1958-59.
- C.2.2. . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Uttar Pradesh, Rabi 1958-59.
- C.2.3. . . . Consolidated results of surveys for estimation of areas brought under improved agricultural practices, 1961-62.

## D. Surveys for Estimating Benefits of Irrigation

### D.I. *Area benefited by minor irrigation works.*

- D.1.1. . . . Review of minor irrigation assessment surveys, 1951-52 to 1959-60.
- D.1.2. . . . Report on the sample survey for the assessment of the utilisation of tubewells, 1957-58.
- D.1.3. . . . Report on the sample check of new wells (G.M.F.) Rajasthan, 1959.
- D.1.4. . . . Report on the check of minor irrigation works in development areas, Rajasthan, 1959.
- D.1.5. . . . Report on the check of minor irrigation works in development areas, Bihar, 1959.

## E. In-service Training of Staff

- E.1. . . . Note on the in-service training of staff.
- E.2. . . . Report on stage II training, Poona, 1961.
- E.3. . . . Report on stage II training, Delhi, 1961.
- E.4. . . . Report on stage III training, Delhi, 1961.
- E.5. . . . Report on stage II training, Delhi, 1962.
- E.6. . . . Report on stage III training, Delhi, 1963.
- E.7. . . . Report on Stage II training, Bangalore, 1965.

## F. Sample Surveys for the Estimation of Fish Catch

- F.1. . . . Review of the sample surveys for estimating the catch of marine fish, 1950 to 1956.
- F.2. . . . Report on the pilot survey of inland fisheries, Orissa, 1962-63.

## M. Miscellaneous

- M.1. . . . Report on the surveys for assessment of additional yield from land reclaimed by Central Tractor Organisation, 1951-52 to 1954-55.

# DIRECTORATE OF NATIONAL SAMPLE SURVEY

(Agricultural Statistics Division)

## List of Publications

### A. Crop Estimation Surveys (State Series)

#### A.1. Annual results

- A.1.1. . . . Consolidated results of crop estimation surveys on principal food crops, 1955-56.
- A.1.2. . . . Consolidated results of crop estimation surveys on principal food crops, 1956-57.
- A.1.3. . . . Consolidated results of crop estimation surveys on principal food crops, 1957-58.
- A.1.4. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1957-58.
- A.1.5. . . . Consolidated results of crop estimation surveys on principal food crops, 1958-59.
- A.1.6. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1958-59.
- A.1.7. . . . Consolidated results of crop estimation surveys on principal food crops, 1959-60.
- A.1.8. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1959-60.
- A.1.9. . . . Consolidated results of crop estimation surveys on principal food crops, 1960-61.
- A.1.10. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1960-61.
- A.1.11. . . . Consolidated results of crop estimation surveys on principal food crops, 1961-62.
- A.1.12. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1961-62.
- A.1.13. . . . Consolidated results of crop estimation surveys on principal food crops, 1949-50 to 1960-61.
- A.1.14. . . . Consolidated results of crop estimation surveys on principal food crops, 1962-63.
- A.1.15. . . . Consolidated results of crop estimation surveys on principal non-food crops, 1962-63.
- A.1.16. . . . Consolidated results of crop estimation surveys on principal crops, 1963-64.

#### A.2. Supervision of crop cutting experiments

- A.2.1. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Kharif, 1960-61.
- A.2.2. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Rabi, 1960-61.
- A.2.3. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1961-62.
- A.2.4. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1962-63.
- A.2.5. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1963-64.
- A.2.6. . . . Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1964-65.

#### A.3. Special studies

- A.3.1. . . . Report on Central driage experiments, 1960-61.
- A.3.2. . . . Report on the joint crop cutting studies at Bundi (Rajasthan), Kharif, 1960-61.
- A.3.3. . . . Report on the joint crop cutting studies at Barh (Bihar), Rabi, 1960-61.
- A.3.4. . . . Report on Central driage experiments, 1961-62.
- A.3.5. . . . Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1960-61 and 1961-62.
- A.3.6. . . . Report on Central driage experiments, 1962-63.
- A.3.7. . . . Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1962-63.
- A.3.8. . . . Report on Central driage experiments, 1963-64.
- A.3.9. . . . Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1963-64.
- A.3.10. . . . Report on Central driage experiments at NSS block offices, 1962-63.
- A.3.11. . . . Report on Type-2 study on maize, Bihar, 1963-64.
- A.3.12. . . . Report on Type-2 study on paddy, Andhra Pradesh, 1963-64.
- A.3.13. . . . Report on Type-2 study on wheat, Uttar Pradesh, 1964-65.
- A.3.14. . . . Report on circular cuts conducted by the NSS Supervisory Staff in the Agricultural Statistics Division, 1964-65.
- A.3.15. . . . Report on Central driage experiments, 1964-65.

(contd. on inner cover)

**CROP ESTIMATION SURVEYS (STATE SERIES)**

**REPORT ON INSPECTION OF CROP CUTTING EXPERIMENTS  
AT HARVEST STAGE ON RANDOMISED BASIS, 1966-67.**

**SERIES**

**A-2**

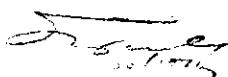
**No. 10**

**DIRECTORATE OF NATIONAL SAMPLE SURVEY  
(Agricultural Statistics Division)  
1967**

## FOREWORD

The Directorate of National Sample Survey has ~~been~~ ~~conducting~~ inspection of field work relating to crop estimation surveys carried out in the States on a randomised basis since 1960-61. The main object of this programme is to provide an independent estimate of yield rate at the all-India level based on the inspected data with a reasonable degree of precision. The programme of inspection has been further intensified since 1965-66 to obtain estimates of average yield with greater precision. The present report deals with the results of inspection carried out during 1966-67. Reports of earlier years have already been brought out in the reports of "A.2 series" on supervision of crop cutting experiments by this Directorate.

New Delhi )  
                  )  
October'67)

  
( S.P. Pande )  
Chief Director.

REPORT ON THE INSPECTION OF CROP CUTTING  
EXPERIMENTS AT HARVEST STAGE ON RANDOMISED  
BASIS 1966-67.

1. Introduction

1.1 As an integral part of its role of technical guidance and coordination of the results of crop estimation surveys carried out in the States, the Directorate of National Sample Survey (NSS) organizes inspection of field work by a central team of supervisors intended largely for ensuring uniformity in concepts, definitions and other details and for ensuring inter-state comparability from the point of all-India consolidation. Since 1960-61, a part of the inspection carried out by the central supervisory staff has been randomised to provide for inspection at harvest in a pre-assigned sample of villages for a few-selected crops. The main object of the programme is to provide an independent estimate of yield rate at the all-India level with a reasonable degree of precision. The results of the programme during the initial years were quite encouraging with the result that this programme has now become <sup>a</sup>regular part of the annual inspection programme of the central supervisory staff. The present report deals with the results of inspection carried out during 1966-67.

2. Coverage

2.1 Consistent with the availability of staff resources, the NSS envisaged a programme of randomised inspection to fulfil the object of obtaining precise estimates of yield rates at all-India level of crops

~~based on inspection at harvest~~ in order that any real differences, if any, between such estimates and estimates based on overall data could be assessed statistically. A review of such a study made during the initial years revealed that the absolute differences, although large between the two sets of estimates, turned out to be statistically not significant because of the magnitude of the associated sampling errors. Accordingly, during 1965-66 the programme was reoriented to cover only a few crops but on an intensive scale with the available staff resources. A similar plan was drawn up for 1966-67 also.

2.2 The States and crops covered by the programme are shown in table 0.1 below.

Table 0.1: Percentage of all-India official estimate of production (1965-66) by states.

| A-KIARIF           |       |           |       |       |
|--------------------|-------|-----------|-------|-------|
| state              | bally | kh. jowar | maize | bajra |
| (1)                | (2)   | (3)       | (4)   | (5)   |
| 1. Andhra Pradesh  | 13    | 10        | 4     | 6     |
| 2. Assam           | 6     | -         | -     | -     |
| 3. Bihar           | 14    | -         | 15    | -     |
| 4. Gujarat         | 1     | 4         | 5     | 19    |
| 5. Jammu & Kashmir | -     | -         | 3     | -     |
| 6. Kerala          | 3     | -         | -     | -     |
| 7. Madhya Pradesh  | 5     | 25        | 10    | 5     |
| 8. Madras          | 12    | 10        | -     | 8     |
| 9. Maharashtra     | 3     | 23        | -     | 7     |
| 10. Mysore         | 4     | 12        | -     | 2     |
| 11. Orissa         | 11    | -         | -     | -     |
| 12. Punjab*        | 2     | 1         | 17    | 8     |
| 13. Rajasthan      | -     | 6         | 14    | 26    |
| 14. Uttar Pradesh  | 7     | 7         | 24    | 17    |
| Total              | 71    | 100       | 71    | 100   |

\* Pre-reorganised.

Table 0.1(contd.):Percentage of all-India official estimate of production (1965-66) by states.

B-RABI

| state              | wheat | gram | jowar |
|--------------------|-------|------|-------|
| (1)                | (2)   | (3)  | (4)   |
| 1. Andhra Pradesh  | -     | -    | 20    |
| 2. Bihar           | 4     | 6    | -     |
| 3. Gujarat         | 5     | -    | 5     |
| 4. Haryana         | 8     | 9    | -     |
| 5. Jammu & Kashmir | 1     | -    | -     |
| 6. Madhya Pradesh  | 13    | 18   | -     |
| 7. Maharashtra     | 3     | 2    | 50    |
| 8. Mysore          | 1     | -    | 25    |
| 9. Punjab          | 18    | 9    | -     |
| 10. Rajasthan      | 7     | 9    | -     |
| 11. Uttar Pradesh  | 39    | 43   | -     |
| total              | 99    | 96   | 100   |

It may be seen from the above table that the spot check covered 14 States during the kharif and 11 during the rabi season. In the case of all crops, the States covered by the programme accounted for more than 80 per cent of the production for the respective crops at all-India level.

3. Sampling design

3.1 The design adopted for crop estimation surveys (except Kerala and Orissa) is one of stratified random sampling with tehsil/revenue inspector circles as strata, villages within a stratum as primary sampling units, fields within each selected village as sampling units

....4.

at the ~~second stage~~ and finally, a plot of specified size as ultimate unit of sample. The allocation of experiments for a crop among strata is generally made on the joint consideration of acreage under the crop and the number of <sup>(P)</sup> primary workers available in each stratum such that work load generally for a member of the field staff can easily be managed in the course of other departmental duties. As a general basis, about 100 to 120 experiments are planned in the major crop growing districts. The experiments in the minor districts are so adjusted that the precision of the estimates for the divisions and the state as a whole is generally high. In each selected village, two fields growing the experimental crop are selected and in each of them one experimental plot of prescribed size marked at random for sample harvest. The shape and size of the plot varied from state to state and may be seen in appendix I. The measurement of yield of a crop within a sample field (usually known as a crop cutting experiment) consists in locating and marking of a plot of the prescribed size in the sample field, harvesting and threshing the produce within it and recording the weight of the produce. In a sub-sample of cases, the produce harvested from the experimental plot is also dried and processed further for determining percentage recovery of dried grain from the harvested produce.



3.2 The ~~design adopted~~ for the survey in Kerala and Orissa is slightly different. In Kerala, talukas form the strata, from each of which 6 villages are chosen at random. In each village 3 plots are selected by systematic random sampling for crop cutting experiments. In Orissa, the strata are formed by grouping contiguous police stations on the basis of geographical area and topographical features. Out of the villages selected for the area enumeration work, a sub-sample of villages is selected for crop cutting experiments, 2 to 3 cuts being planned in each village.

3.3 The field work of the survey, comprising selection of field and conduct of experiments therein, is entrusted to the staff of the state department of revenue and/or agriculture depending on the work load and administrative convenience.

3.4 The spot check was organized in a sub-sample of fields selected randomly out of those chosen in the the state series for yield observation. For this purpose, requisite number of villages corresponding to half the number of experiments proposed for inspection for each crop in each state (except for Kerala and Orissa) were selected with equal probability and without replacement from the list of villages selected for state series. In the states, where the practice of selecting common villages for different crops was in vogue, the procedure prescribed for selecting villages for the spot check, as in the earlier years, made use of these common villages as far as possible for selecting a sub-sample. It was

ensured that the spot check covered the entire state.

#### 4. Sample size

4.1 A sample of 2,670 (1,720 on kharif crops including 30 experiments on tabi paddy in Andhra Pradesh and 950 on rabi crops) was proposed to be covered under this programme on specified crops. State-wise and crop-wise distribution is given below in table 0.2.

Table 0.2: Sample size and distribution of work among supervisors.

| state              | A-KHARIF              |   |  |     |     | total | Average number of experiments per supervisor |
|--------------------|-----------------------|---|--|-----|-----|-------|--|
|                    | number of supervisors | number of village sections at harvest stage | number of expts. (@ 2 per section) proposed for inspection at harvest stage. |     |     |       |  |
| (1)                | (2)                   | (3)   | (4)  | (5) | (6) | (7)   | (8)  |
| 1. Andhra Pradesh  | 7                     | *80   | 60   | 30  | 30  | 200   | 29   |
| 2. Assam           | 4                     | 60  | -  | -   | -   | 60    | 15   |
| 3. Bihar           | 9                     | 100   | -  | 60  | -   | 160   | 18   |
| 4. Gujarat         | 6                     | -   | 30   | 20  | 50  | 100   | 17   |
| 5. Jammu & Kashmir | 2                     | -   | -  | 30  | -   | 30    | 15   |
| 6. Kerala          | 2                     | 60  | -  | -   | -   | 60    | 30   |
| 7. Madhya Pradesh  | 7                     | 30  | 40   | 30  | 20  | 120   | 17   |
| 8. Madras          | 7                     | 50  | 60   | -   | 50  | 160   | 23   |
| 9. Maharashtra     | 9                     | 20  | 20   | -   | 40  | 140   | 16   |
| 10. Mysore         | 3                     | 20  | 30   | -   | 20  | 120   | 15   |
| 11. Orissa         | 4                     | 70  | -  | -   | -   | 70    | 17   |
| 12. Punjab &       | 9                     | 20  | 20   | 50  | 30  | 120   | 13   |
| 13. Rajasthan      | 9                     | -   | 50   | 50  | 50  | 150   | 17   |
| 14. Uttar Pradesh  | 13                    | 70  | 60   | 60  | 40  | 230   | 18   |
| Total              | 96                    | 580   | 480  | 330 | 330 | 1720  | 18   |

\* Includes 30 experiments planned for tabi paddy.

& Pre-reorganised.

Table 0.2(contd.) Sample size and distribution of work among supervisors.

B-RABI

| state               | number of experiments (@ 2 per village) proposed for inspection at harvest stage |       |      |       |       | average number of expts. per supervisor |
|---------------------|--|-------|------|-------|-------|---|
|                     | number of supervisors  | wheat | gram | jowar | total |   |
| (1)                 | (2)  | (3)   | (4)  | (5)   | (6)   | (7)                                     |
| 1. Anihra Pradesh   | 7  | -     | -    | 50    | 50    | 7                                       |
| 2. Bihar            | 9  | 40    | 50   | -     | 90    | 10                                      |
| 3. Gujarat          | 6  | 40    | -    | 20    | 60    | 10                                      |
| 4. Jammu & Kashmir  | 2  | 20    | -    | -     | 20    | 10                                      |
| 5. Madhya Pradesh   | 7  | 50    | 60   | -     | 110   | 16                                      |
| 6. Maharashtra      | 9  | 50    | 20   | 70    | 140   | 16                                      |
| 7. Mysore           | 8  | 30    | -    | 60    | 90    | 11                                      |
| 8. Punjab & Haryana | 9  | 60    | 80   | -     | 140   | 16                                      |
| 9. Rajasthan        | 9  | 50    | 60   | -     | 110   | 12                                      |
| 10. Uttar Pradesh   | 13   | 60    | 80   | -     | 140   | 11                                      |
| Total               | 79   | 400   | 350  | 200   | 950   | 12                                      |

The plan provided for inspection of about 600 experiments for paddy, 500 for kharif-jowar, 400 for wheat and about 350 for maize, bajra and gram and 200 for rabi-jowar. The scale of inspection at harvest during 1966-67 was practically of the same order as that for 1965-66 except for the replacement of ragi by bajra.

5. Personnel

5.1 In all 96 and 79 supervisors of the Agricultural Statistics Division of the Directorate of NSS, distributed over different states in kharif and rabi seasons of 1966-67, respectively, were entrusted with inspection programme.

~~The supervisors had~~ considerable experience in this type of work and were adequately trained in the operation of the programme. The programme in each state was formulated, supervised and coordinated by the officer-in-charge in each state. Officers from the headquarters of this Directorate were also associated for providing necessary guidance.

#### 6. Item of work

6.1 The programme of spot check envisaged selection of villages at the regional offices in the states from the list of villages selected for the state-series for crop estimation surveys. These were provided by the respective state statistical bureau or offices of the state agricultural statisticians. The spot check consisted, in the main, of getting the state primary workers to visit the selected villages and fields at the appropriate time during the season and ensuring that they marked and harvested plot of the prescribed size in accordance with the instructions and reported the weight of clean harvested produce correctly in the schedules for all the experiments planned for the programme.

6.2 The field work of crop cutting experiments is carried out in three stages. During the first stage the work relates to identification of sample villages, selection of fields for yield observation in accordance with the procedure prescribed and fixing the dates of harvest for sample fields in consultation with the cultivators. The field work at the second stage is

~~carried out on the harvesting day~~ and consists of demarcating the area of plot within the selected field starting from a randomly located point, and taking yield observations therefrom. In the third stage of the work, which is done on a sub-sample of the yield measurements, the weight of the dried grain is taken after proper processing.

6.3 The central supervisory staff carried out inspection at one or more of the stages of the field work mentioned above. For the pre-assigned programme of inspection, the main emphasis is on the observation at the harvest-stage. Preliminary visits to the sample villages, when made, were for the purposes of obtaining dates of harvest of the selected fields. However, such visits had progressively been reduced, thanks to the organization by the State Departments who had made suitable arrangements for communicating harvest dates of sample fields to the central team of supervisors sufficiently in good time. However, in the absence of any special arrangements for obtaining the harvest dates, preliminary visits were paid to the sample villages to avoid loss of experiments for inspection at harvest. All possible steps were taken to ensure that the central supervisory staff cover all the experiments planned under the pre-assigned programme.

6.4 The main aspect of inspection of field work consisted in visiting the selected villages on the appropriate day fixed for harvest of sample fields, in ensuring

the accuracy of crop cutting experiments conducted in the sample plots and finally in obtaining the weight of the green produce. The harvested produce was in the form of cobs for kharif and rabi, bajra and maize and grain for paddy, wheat and gram. It was ensured that the field work pertaining to the observation on yield, removal of grain and recording of its weight, even if it involved a prolonged stay in a village or even a repeat visit to the village, was carried out scrupulously by the supervisory staff. Further, sometimes due to different harvest dates for the two experimental plots in the same village or due to last minute changes in the harvesting date owing to vagaries of weather or to suit the convenience of the cultivators, more than one visit had to be paid to the village for inspecting harvest operations.

6.5 With the organization of central irrigation experiments at the headquarters of the NSS additional visits to the sample villages subsequent to the harvest for observing irrigation operations have been dispensed with. Table 0.4 below gives details of the number of visits paid on an average to a sample village at the pre-harvest and harvest stages for the purposes of spot check.

Table: 0.4 Number of visits per village

| state             | A-KHARIF                            |         |       |
|-------------------|-------------------------------------|---------|-------|
|                   | average number of visit per village |         |       |
|                   | pre-harvest                         | harvest | total |
| (1)               | (2)                                 | (3)     | (4)   |
| 1. Andhra Pradesh | 0.0                                 | 1.2     | 1.2   |
| 2. Assam          | 0.0                                 | 1.2     | 1.2   |
| 3. Bihar          | 0.0                                 | 1.2     | 1.2   |

| state               | average number of visits per village |         |       |
|---------------------|--------------------------------------|---------|-------|
|                     | pre-harvest                          | harvest | total |
| (1)                 | (2)                                  | (3)     | (4)   |
| 4. Gujarat          | 0.2                                  | 1.0     | 1.2   |
| 5. Jammu & Kashmir  | 0.1                                  | 1.0     | 1.1   |
| 6. Kerala           | 0.8                                  | 1.8     | 2.6   |
| 7. Madhya Pradesh   | 0.2                                  | 1.1     | 1.3   |
| 8. Madras           | 0.6                                  | 1.6     | 2.2   |
| 9. Maharashtra      | 0.2                                  | 1.3     | 1.5   |
| 10. Mysore          | 0.4                                  | 1.2     | 1.6   |
| 11. Orissa          | 0.2                                  | 1.2     | 1.4   |
| 12. Punjab*         | 0.5                                  | 1.3     | 1.8   |
| 13. Rajasthan       | 0.2                                  | 1.1     | 1.3   |
| 14. Uttar Pradesh   | 0.0                                  | 1.1     | 1.1   |
| All States combined | 0.2                                  | 1.2     | 1.4   |

\* Pre-reorganised.

Table 0.4(contd.) Number of visits per village

B -RABI

| state               | average number of visits per village |         |       |
|---------------------|--------------------------------------|---------|-------|
|                     | pre-harvest                          | harvest | total |
| (1)                 | (2)                                  | (3)     | (4)   |
| 1. Andhra Pradesh   | 0.0                                  | 1.1     | 1.1   |
| 2. Bihar            | 0.0                                  | 1.3     | 1.3   |
| 3. Gujarat          | 0.8                                  | 1.2     | 2.0   |
| 4. Haryana          | 0.5                                  | 1.3     | 1.8   |
| 5. Jammu & Kashmir  | 0.3                                  | 1.1     | 1.4   |
| 6. Madhya Pradesh   | 0.2                                  | 1.2     | 1.4   |
| 7. Maharashtra      | 0.2                                  | 1.2     | 1.4   |
| 8. Mysore           | 0.3                                  | 1.1     | 1.4   |
| 9. Punjab           | 0.6                                  | 1.4     | 2.0   |
| 10. Rajasthan       | 0.4                                  | 1.3     | 1.7   |
| 11. Uttar Pradesh   | 0.0                                  | 1.2     | 1.2   |
| All states combined | 0.3                                  | 1.2     | 1.5   |

6.6 The programme of work generally involved about two visits to a sample village. The average number of visits per village was highest in Kerala, but in this state the number of sample cuts per village were three as against two in each village in the other states. For states other than Kerala, the average number of visits per village was highest for Madras (2.2 during kharif) and Gujarat and Punjab (2.0 during rabi). The number of visits was the least for Jammu & Kashmir and U.P. (1.1 during kharif) and Andhra Pradesh (1.1 during rabi).

6.7 In addition to the work of inspection at harvest-stage in a pre-assigned sample of villages, the supervisors were also required to record yield observation from square cut of size 5m X 5m in a sub-sample of fields for comparing the yield obtained with those from the state cuts. The results relating to the square cuts are presented in a separate report. Besides attending to the above mentioned items of work, the supervisors also observed the field work of crop estimation surveys outside the pre-assigned programme, and of other surveys and studies relating to agricultural statistics.

#### 7. Formation of zones.

7.1 A programme of work during 1966-67 was formulated in each region by the Officer-in-charge. Generally compact zone, each consisting of 6 to 8 sample villages, was assigned to each supervisor. Consideration of harvesting period, location of sample points and transport facilities were duly taken note of. Such a programme was found quite



~~successful in all~~ the states. No doubt, some flexibility existed in the manner of re-allocation of samples to supervisors at the discretion of the Officer-in-charge in the regions in order to meet the emergent situation arising out of sudden revision in harvest dates communicated by state field staff.

8. Execution of field programme.

8.1 One of the handicaps in the execution of harvest-stage inspection programme related to the sudden changes communicated by the state field staff regarding dates of harvesting. In practice, although the dates of harvest were fixed in consultation with the cultivators, often owing to vagaries of weather, some changes in the dates were made by the cultivators at the time of actual harvesting. To obviate any loss of inspection of sample harvest, all care was taken to keep a close watch on this item. The primary workers or local officials and sometimes even the cultivators were requested to intimate such changes to the regional office telegraphically, whenever necessary. The magnitude of the problem may be had from the crop-wise percentages of experiments, for which the dates had to be changed, shown in table 0.5 below.

Table 0.5: Percentage of cases where harvest late was changed.

| kharif        |                     | rabi        |                     |
|---------------|---------------------|-------------|---------------------|
| crop          | percentage of cases | crop        | percentage of cases |
| (1)           | (2)                 | (3)         | (4)                 |
| paddy         | 36                  | wheat       | 63                  |
| jowar(kharif) | 53                  | gram        | 53                  |
| maize         | 32                  | jowar(rabi) | 50                  |
| bajra         | 61                  |             |                     |
| total         | 45                  | total       | 51                  |

The ~~originally fixed~~ dates of harvest had to be changed (In about 45 per cent cases in kharif and 51 per cent cases in rabi season).

8.2 There were sometimes also gaps of about a week in the harvest dates for the two experiments in the same village or between the harvesting and threshing operations for the same experiment. These necessitated repeated visit to the sample villages and the intervening period was utilised for carrying out other items of work, which were taken up after ensuring that they did not hamper the progress of harvest stage inspection programme.

#### 9. Period of field work.

9.1 The field work commenced in each state about a fortnight prior to the harvesting season of the crops covered in the states and came to a close as soon as the harvesting season was over. In most of the northern states, the harvesting period was spread over nearly eight to ten weeks during kharif season and about eight weeks during the rabi season. In between the two seasons, usually there was a gap of one to two months. In southern states, however, the harvesting period for kharif crops was spread over a period of 4 to 5 months.

#### 10. Response.

10.1 Out of a total of 2,670 experiments proposed for inspection as many as 2,433 (91 per cent) were inspected at harvest stage. State-wise details are given in statements 1 & 2 in the appendix. The number of experiments inspected for crops together is given below separately for kharif and rabi seasons.

Table 0.6: Response

| season  | number of experiments |           | percentage inspected. |
|---------|-----------------------|-----------|-----------------------|
|         | planned               | inspected |                       |
| (1)     | (2)                   | (3)       | (4)                   |
| khariif | 1720*                 | 1561      | 91                    |
| rabi    | 950                   | 872       | 92                    |
| Total   | 2670                  | 2433      | 91                    |

\* Includes 30 experiments on tabi paddy in Andhra Pradesh. A total of 237 experiments could not be inspected at harvest by the central supervisory staff. The main reasons for the loss of experiments were (a) non-receipt of dates of harvesting (82 cases), (b) harvesting of the crop prior to the dates fixed for harvest (98 cases), (c) inability of the central supervisory staff to witness harvesting operations on account of their pre-occupation somewhere else and inspection by state supervisory staff in some cases where sufficient time was not available for informing the central supervisory staff regarding the date of harvest due to pressure from cultivators for early harvest prior to the dates fixed (39 cases) and (d) other reasons (18 cases). State-wise and crop-wise break-up of loss of experiments according to the reasons is given in statement 3 in the appendix. The loss of experiments is of a negligible order for paddy, wheat and gram crops. However, in respect of millet crops, it exceeded 10 per cent. The loss was mainly due to sudden changes in the dates of harvest due to adverse weather conditions, and the consequent

inability of the central supervisory staff to reschedule their programmes to be present on the dates of harvest.

10.2 Of the experiments inspected, in about 8 per cent cases each during kharif and rabi season, the sample harvest was done in fields substituted in the place of initially selected random fields. A substitution would take place, for example, if the field which would have been selected according to the procedure laid down was found harvested at the time of selection. Since this would affect the results, special care was taken to ensure that the percentage of such cases was the bare minimum. Substitutions were permitted only in those cases where the crop in a selected village/field was harvested before the actual conduct of the experiment, provided the instructions issued by the state allowed for substitution in such cases. Otherwise, such experiments, were considered as lost.

10.3 As already mentioned earlier, visits to the sub-sample of fields selected for harvest-stage inspection were not made subsequent to the harvest for inspection of triage experiments. The results of triage adopted for the report are based on the central triage experiments carried out by this Directorate under controlled conditions. For this purpose, the produce of square cuts referred to earlier was mailed to Faridabad (near Delhi) directly from the field.

10.4 Statements 1 & 2 give details regarding the number of experiments planned state-wise and crop-wise, response and substitution and also the number of triage experiments conducted centrally. Details of the procedure followed for the central triage experiments along with triage ratio used for this report are given in Appendix II. A detailed report of central triage experiments 1966-67 has been brought out separately.

### 11. Estimation procedure.

11.1 The selection of sample fields for harvest stage inspection programme was made from among the fields in selected villages growing the crop pertaining to the state list of sample villages adopted for regular crop estimation surveys, where the selection of fields was done irrespective of whether the crop was sown alone in the field (pure) or in mixture with other crop (mixed). The estimate of the average yield rate worked out by treating the sample plot yield as directly obtained from the cuts, irrespective of whether the cuts were from pure sown fields or from fields sown with crop in mixture, is termed the gross yield rate. If the plot yield from mixed fields are divided by the corresponding proportions of area under the crop in the fields obtained by eye estimation, and then added to the plot yields from all the plots sown with the pure crop. The resulting estimate of average yield is termed the net yield rate.

11.2 Data obtained from experiments inspected under the harvest stage inspection programme were tabulated and state-wise gross and net yield rates obtained, together with the sampling errors associated with the net yield rates. The yield rate of a crop at state level was obtained as a simple average in terms of the green harvested produce, and then multiplied with the corresponding drilage ratio. The drilage ratios based on the central drilage experiments mentioned earlier were utilised to obtain estimates of the yield rate in terms of dry grain.

11.3 The yield rates (in terms of dry grain) were pooled over states by using the respective crop areas as weights. The sampling errors of the estimates were obtained adopting the usual formula for two stage simple random sampling.

## 12. Results.

12.1 Table 0.7 below gives the net yield rates based on the results of inspection at harvest of crop cutting experiments carried out by the state field staff for each crop for the states covered by the inspection programme. The yield rates are in terms of dry grain. The sampling errors of the estimated yield rates are also shown against them.

.....

Table 0.7: Net yield rates of dried grain in Kgs./Hect.

| crop          | number of experiments | average yield in kgs./hect. | percentage sampling error. |
|---------------|-----------------------|-----------------------------|----------------------------|
| (1)           | (2)                   | (3)                         | (4)                        |
| rice          | 547                   | 779                         | 4.7                        |
| jowar(kharif) | 425                   | 456                         | 5.7                        |
| maize         | 295                   | 919                         | 5.6                        |
| bajra         | 294                   | 326                         | 9.7                        |
| wheat         | 363                   | 875                         | 5.9                        |
| gram          | 330                   | 389                         | 8.6                        |
| jowar(rabi)   | 174                   | 577                         | 7.4                        |

The results suggest the following observations:

12.2 The yield rates at the all-India level (for the states covered) have been estimated with sampling error of 4 to 6 per cent for individual crops except for bajra, gram and jowar(rabi) (8 to 10 per cent). The sampling errors of the estimates of average yield of bajra, gram and jowar(rabi) are somewhat on the high side, due mainly to the unfavourable weather conditions. It may be of interest to mention that there was a significant proportion of fields for bajra reporting zero yields.

12.3 On a comparison of dried yield rates obtained during 1965-66 on the basis of spot check carried out on almost the same scale of inspection, it has been observed that the yield rates for all crops except wheat and rabi-jowar registered a decline. It may be mentioned that during 1966-67 bajra was replaced by ragi and no

comparison has, therefore, been made for these two crops. The average yield for gram was lower during 1966-67 by 26 per cent. The fall in yield rate is attributed to the fact that gram crop was reported to be affected for want of adequate rains at the time of sowing and failure of winter rains coupled with cold wave in January. The table 0.3 below gives the comparative results for the two years 1965-66 and 1966-67 based on inspected data for the common crops covered.

Table 0.3: Comparison of net yield rates of dried grain in kgs./hect. (1965-66 & 1966-67).

| crop          | number of expts |       | average yield in kg./hect. |       | percentage difference |
|---------------|-----------------|-------|----------------------------|-------|-----------------------|
|               | 65-66           | 66-67 | 65-66                      | 66-67 |                       |
| (1)           | (2)             | (3)   | (4)                        | (5)   | (6)                   |
| rice          | 530             | 547   | 733                        | 779   | 1.1                   |
| jowar(kharif) | 470             | 425   | 505                        | 456   | 9.7                   |
| maize         | 280             | 295   | 1052                       | 919   | 12.6                  |
| wheat         | 331             | 363   | 700                        | 875   | -9.5                  |
| gram          | 327             | 330   | 523                        | 339   | 26.3                  |
| jowar(rabi)   | 197             | 174   | 544                        | 577   | -6.1                  |

12.4 While the main object of the harvest-stage inspection programme was to provide estimates of individual crops at all-India level, an attempt has nonetheless been made to present estimated yield rates for different states in statements 4 & 5. The estimates for the individual crop for the states covered have comparatively larger errors than those to be expected due to relatively small sample sizes. These estimates are based on data at state level.



12.5 It may be of interest to make a comparison of the yield rates for individual states based on the sample check with that of the yield rates based on overall data. Table 0.9 provides such a comparison.

Table 0.9: Comparison of net yield rates state series and harvest stage inspection 1966-67.

| crop          | average yield in kgs./hect |            | percentage difference |
|---------------|----------------------------|------------|-----------------------|
|               | state                      | inspection |                       |
| rice          | 326                        | 770        | 5.7                   |
| jowar(kharif) | 465                        | 453        | 1.9                   |
| maize         | 934                        | 919        | 1.6                   |
| bajra         | 356                        | 326        | 8.4                   |
| wheat         | 874                        | 875        | 1.0                   |
| gram          | 427                        | 380        | 8.9                   |
| jowar (rabi)  | 552                        | 577        | -4.3                  |

It may be clarified that the harvest-stage inspection sample is a part of the entire state sample allotted for regular crop estimation surveys and, therefore, the yield data from the fields selected for spot check form part of the data for state tabulation also for formulating the estimates for state series. It is observed that the yield rates based on harvest-stage inspection programme at all-India level is in close agreement with the yield rate of the state series for individual crops covered by the programme.

### 13. Conclusion

The programme of pre-assigned sample has demonstrated the feasibility of estimating the yield rate at the all-India level with a reasonable degree of precision by a central team of supervisors. The percentage sampling errors of yield rates based on the data from the sample check was between 4 to 6 per cent in case of all crops except gram, bajra and jowar (rabi) ( 8 to 10 per cent). The estimates based on the spot inspection compared favourably with the over-all state data.

Statement 1: Number of experiments planned, inspected, substituted and central drilage experiments - Kharif, 1966-67

| state           | paddy                 |            |                         |              |              |                               | jowar                 |            |                         |              |              |                                | maize                 |            |                         |              |              |                                     |    |
|-----------------|-----------------------|------------|-------------------------|--------------|--------------|-------------------------------|-----------------------|------------|-------------------------|--------------|--------------|--------------------------------|-----------------------|------------|-------------------------|--------------|--------------|-------------------------------------|----|
|                 | Number of experiments |            | number of substitutions |              |              | no. of central drilage expts. | number of experiments |            | number of substitutions |              |              | no. of cen-tral drilage expts. | number of experiments |            | number of substitutions |              |              | no. of cen-tral drilage experiments |    |
|                 | planned               | ins-pected | village                 | experi-ments | total expts. |                               | planned               | ins-pected | village                 | experi-ments | total expts. |                                | planned               | ins-pected | village                 | experi-ments | total expts. |                                     |    |
| (1)             | (2)                   | (3)        | (4)                     | (5)          | (6)          | (7)                           | (8)                   | (9)        | (10)                    | (11)         | (12)         | (13)                           | (14)                  | (15)       | (16)                    | (17)         | (18)         | (19)                                |    |
| Andhra Pradesh  | 80                    | 80         | ..                      | 2            | 2            | 31                            | 60                    | 60         | ..                      | 1            | 1            | 17                             | 30                    | 30         | ..                      | 2            | 2            | ..                                  |    |
| Assam           | 60                    | 56         | 1                       | 1            | 3            | ..                            | ..                    | ..         | ..                      | ..           | ..           | ..                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  | .. |
| Bihar           | 100                   | 98         | 2                       | 8            | 12           | 40                            | ..                    | ..         | ..                      | ..           | ..           | ..                             | 60                    | 49         | 3                       | 16           | 22           | 28                                  |    |
| Gujarat         | ..                    | ..         | ..                      | ..           | ..           | ..                            | 30                    | 24         | ..                      | ..           | ..           | 15                             | 20                    | 16         | ..                      | ..           | ..           | 12                                  |    |
| Jammu & Kashmir | ..                    | ..         | ..                      | ..           | ..           | ..                            | ..                    | ..         | ..                      | ..           | ..           | ..                             | 30                    | 25         | ..                      | ..           | ..           | 14                                  |    |
| Kerala          | 60                    | 56         | ..                      | 3            | 3            | ..                            | ..                    | ..         | ..                      | ..           | ..           | ..                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  |    |
| Madhya Pradesh  | 30                    | 27         | ..                      | ..           | ..           | 15                            | 40                    | 39         | ..                      | ..           | ..           | 30                             | 30                    | 28         | ..                      | ..           | ..           | 23                                  |    |
| Madras          | 50                    | 46         | ..                      | 3            | 3            | 25                            | 60                    | 51         | 1                       | 2            | 4            | 16                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  |    |
| Maharashtra     | 20                    | 19         | ..                      | 1            | 1            | 19                            | 80                    | 79         | ..                      | 14           | 14           | 42                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  |    |
| Mysore          | 20                    | 18         | ..                      | 2            | 2            | 11                            | 80                    | 67         | ..                      | 10           | 10           | 30                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  |    |
| Orissa          | 70                    | 67         | ..                      | 6            | 6            | ..                            | ..                    | ..         | ..                      | ..           | ..           | ..                             | ..                    | ..         | ..                      | ..           | ..           | ..                                  |    |
| Punjab*         | 20                    | 20         | ..                      | 1            | 1            | 16                            | 20                    | 20         | ..                      | ..           | ..           | ..                             | 50                    | 50         | ..                      | 5            | 5            | 38                                  |    |
| Rajasthan       | ..                    | ..         | ..                      | ..           | ..           | ..                            | 50                    | 46         | ..                      | ..           | ..           | 13                             | 50                    | 43         | 1                       | ..           | 2            | 18                                  |    |
| Uttar Pradesh   | 70                    | 60         | ..                      | 3            | 3            | 30                            | 60                    | 39         | ..                      | 2            | 2            | 18                             | 60                    | 54         | ..                      | 5            | 5            | 32                                  |    |
| States covered  | 580                   | 547        | 3                       | 30           | 36           | 187                           | 480                   | 425        | 1                       | 29           | 31           | 190                            | 330                   | 295        | 4                       | 28           | 36           | 165                                 |    |

\* Pre-reorganised.

Statement 1: (Contd.)

| state                  | bajra                 |            |                         |              |              |                              | Kharif - crops        |             |                         |               |              |                                 |
|------------------------|-----------------------|------------|-------------------------|--------------|--------------|------------------------------|-----------------------|-------------|-------------------------|---------------|--------------|---------------------------------|
|                        | number of experiments |            | number of substitutions |              |              | no. of central dridge expts. | number of experiments |             | number of substitutions |               |              | number of central dridge expts. |
|                        | planned               | inspected  | vi-llage                | exp-ri-ments | total expts. |                              | planned               | inspected   | vi-llage                | expe-ri-ments | total expts. |                                 |
| (1)                    | (20)                  | (21)       | (22)                    | (23)         | (24)         | (25)                         | (26)                  | (27)        | (28)                    | (29)          | (30)         | (31)                            |
| Andhra Pradesh         | 30                    | 29         | ..                      | ..           | ..           | 15                           | 200                   | 199         | ..                      | 5             | 5            | 63                              |
| Assam                  | ..                    | ..         | ..                      | ..           | ..           | ..                           | 60                    | 56          | 1                       | 1             | 3            | ..                              |
| Bihar                  | ..                    | ..         | ..                      | ..           | ..           | ..                           | 160                   | 147         | 5                       | 24            | 34           | 68                              |
| Gujarat                | 50                    | 40         | ..                      | ..           | ..           | 30                           | 100                   | 80          | ..                      | ..            | ..           | 57                              |
| Jammu & Kashmir        | ..                    | ..         | ..                      | ..           | ..           | ..                           | 30                    | 25          | ..                      | ..            | ..           | 14                              |
| Kerala                 | ..                    | ..         | ..                      | ..           | ..           | ..                           | 60                    | 56          | ..                      | 3             | 3            | ..                              |
| Madhya Pradesh         | 20                    | 18         | ..                      | ..           | ..           | 13                           | 120                   | 112         | ..                      | ..            | ..           | 81                              |
| Madras                 | 50                    | 43         | 1                       | 6            | 8            | 11                           | 160                   | 140         | 2                       | 11            | 15           | 52                              |
| Maharashtra            | 40                    | 39         | ..                      | 3            | 3            | 25                           | 140                   | 137         | ..                      | 18            | 18           | 86                              |
| Mysore                 | 20                    | 18         | ..                      | 4            | 4            | 16                           | 120                   | 103         | ..                      | 16            | 16           | 57                              |
| Orissa                 | ..                    | ..         | ..                      | ..           | ..           | ..                           | 70                    | 67          | ..                      | 6             | 6            | ..                              |
| Punjab *               | 30                    | 28         | ..                      | ..           | ..           | 25                           | 120                   | 118         | ..                      | 6             | 6            | 88                              |
| Rajasthan              | 50                    | 46         | ..                      | ..           | ..           | 12                           | 150                   | 135         | 1                       | ..            | 2            | 43                              |
| Uttar Pradesh          | 40                    | 33         | ..                      | 5            | 5            | 19                           | 230                   | 186         | ..                      | 15            | 15           | 99                              |
| <b>States covered:</b> | <b>330</b>            | <b>294</b> | <b>1</b>                | <b>18</b>    | <b>20</b>    | <b>166</b>                   | <b>1720</b>           | <b>1561</b> | <b>9</b>                | <b>105</b>    | <b>123</b>   | <b>708</b>                      |

\* Pre-reorganised.

Statement 2: Number of experiments planned, inspected, substituted and central drriage experiments - rabi, 1966-67.

| state           | wheat                 |           |                         |              |              |                               | gram                  |           |                         |              |              |                               |
|-----------------|-----------------------|-----------|-------------------------|--------------|--------------|-------------------------------|-----------------------|-----------|-------------------------|--------------|--------------|-------------------------------|
|                 | number of experiments |           | number of substitutions |              |              | no. of central drriage expts. | number of experiments |           | number of substitutions |              |              | no. of central drriage expts. |
|                 | planned               | inspected | vi-llage                | experi-ments | total expts. |                               | planned               | inspected | vi-llage                | experi-ments | total expts. |                               |
| (1)             | (2)                   | (3)       | (4)                     | (5)          | (6)          | (7)                           | (8)                   | (9)       | (10)                    | (11)         | (12)         | (13)                          |
| Andhra Pradesh  | ..                    | ..        | ..                      | ..           | ..           | ..                            | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Bihar           | 40                    | 40        | ..                      | 3            | 3            | 22                            | 50                    | 50        | ..                      | 12           | 12           | 23                            |
| Gujarat         | 40                    | 33        | ..                      | ..           | ..           | 20                            | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Haryana         | 26                    | 24        | ..                      | 1            | 1            | 20                            | 46                    | 46        | ..                      | 1            | 1            | 29                            |
| Jammu & Kashmir | 20                    | 16        | ..                      | ..           | ..           | 13                            | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Madhya Pradesh  | 50                    | 48        | ..                      | ..           | ..           | 22                            | 60                    | 59        | ..                      | ..           | ..           | 27                            |
| Maharashtra     | 50                    | 47        | ..                      | 3            | 3            | 20                            | 20                    | 19        | ..                      | 1            | 1            | 14                            |
| Mysore          | 30                    | 27        | ..                      | 8            | 8            | 8                             | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Punjab          | 34                    | 34        | ..                      | 1            | 1            | 25                            | 31                    | 32        | ..                      | 1            | 1            | 23                            |
| Rajasthan       | 50                    | 43        | ..                      | ..           | ..           | 32                            | 60                    | 56        | ..                      | ..           | ..           | 23                            |
| Utter Pradesh   | 60                    | 56        | ..                      | 10           | 10           | 43                            | 80                    | 68        | ..                      | 8            | 8            | 34                            |
| States covered  | 400                   | 368       | ..                      | 26           | 26           | 225                           | 350                   | 330       | ..                      | 23           | 23           | 173                           |

Statement 2: (contd.)

| state           | rabi-jowar            |           |                         |             |              |                              | rabi-crops            |           |                         |             |              |                              |
|-----------------|-----------------------|-----------|-------------------------|-------------|--------------|------------------------------|-----------------------|-----------|-------------------------|-------------|--------------|------------------------------|
|                 | number of experiments |           | number of substitutions |             |              | no. of central driage expts. | number of experiments |           | number of substitutions |             |              | no. of central driage expts. |
|                 | planned               | inspected | vi-llage                | experiments | total expts. |                              | planned               | inspected | vi-llage                | experiments | total expts. |                              |
| (1)             | (14)                  | (15)      | (16)                    | (17)        | (18)         | (19)                         | (20)                  | (21)      | (22)                    | (23)        | (24)         | (25)                         |
| Andhra Pradesh  | 50                    | 40        | ..                      | 2           | 2            | 20                           | 50                    | 40        | ..                      | 2           | 2            | 20                           |
| Bihar           | ..                    | ..        | ..                      | ..          | ..           | ..                           | 90                    | 90        | ..                      | 15          | 15           | 45                           |
| Gujarat         | 20                    | 18        | ..                      | ..          | ..           | 15                           | 60                    | 51        | ..                      | ..          | ..           | 35                           |
| Haryana         | ..                    | ..        | ..                      | ..          | ..           | ..                           | 72                    | 70        | ..                      | 2           | 2            | 49                           |
| Jammu & Kashmir | ..                    | ..        | ..                      | ..          | ..           | ..                           | 20                    | 16        | ..                      | ..          | ..           | 13                           |
| Madhya Pradesh  | ..                    | ..        | ..                      | ..          | ..           | ..                           | 110                   | 107       | ..                      | ..          | ..           | 49                           |
| Maharashtra     | 70                    | 66        | ..                      | 5           | 5            | 59                           | 140                   | 132       | ..                      | 9           | 9            | 93                           |
| Mysore          | 60                    | 50        | ..                      | 8           | 8            | 38                           | 90                    | 77        | ..                      | 16          | 16           | 46                           |
| Punjab          | ..                    | ..        | ..                      | ..          | ..           | ..                           | 68                    | 66        | ..                      | 2           | 2            | 48                           |
| Rajasthan       | ..                    | ..        | ..                      | ..          | ..           | ..                           | 110                   | 99        | ..                      | ..          | ..           | 55                           |
| Uttar Pradesh   | ..                    | ..        | ..                      | ..          | ..           | ..                           | 140                   | 124       | ..                      | 18          | 18           | 77                           |
| States covered  | 200                   | 174       | ..                      | 15          | 15           | 102                          | 950                   | 872       | ..                      | 64          | 64           | 530                          |

Statement 3: Reasons for loss of experiments 1966-67

| crop                  | state           | number of experiments |            | reasons for loss of experiments |           |          |          | total expts. lost |
|-----------------------|-----------------|-----------------------|------------|---------------------------------|-----------|----------|----------|-------------------|
|                       |                 | planned               | received   | A                               | B         | C        | D        |                   |
| (1)                   | (2)             | (3)                   | (4)        | (5)                             | (6)       | (7)      | (8)      | (9)               |
| <u>Kharif</u>         |                 |                       |            |                                 |           |          |          |                   |
| Paddy                 | Andhra Pradesh  | 80                    | 80         | -                               | -         | -        | -        | -                 |
|                       | Assam           | 60                    | 56         | 3                               | 1         | -        | -        | 4                 |
|                       | Bihar           | 100                   | 98         | -                               | 2         | -        | -        | 2                 |
|                       | Kerala          | 60                    | 56         | -                               | 4         | -        | -        | 4                 |
|                       | Madhya Pradesh  | 30                    | 27         | 2                               | -         | -        | 1        | 3                 |
|                       | Madras          | 50                    | 46         | 2                               | -         | -        | 2        | 4                 |
|                       | Maharashtra     | 20                    | 19         | -                               | 1         | -        | -        | 1                 |
|                       | Mysore          | 20                    | 18         | 2                               | -         | -        | -        | 2                 |
|                       | Orissa          | 70                    | 67         | -                               | 1         | 2        | -        | 3                 |
|                       | Punjab *        | 20                    | 20         | -                               | -         | -        | -        | -                 |
|                       | Uttar Pradesh   | 70                    | 60         | 3                               | 5         | 2        | -        | 10                |
| <u>States covered</u> |                 | <u>580</u>            | <u>547</u> | <u>12</u>                       | <u>14</u> | <u>4</u> | <u>3</u> | <u>33</u>         |
| Kharif-Jowar          | Andhra Pradesh  | 60                    | 60         | -                               | -         | -        | -        | -                 |
|                       | Gujarat         | 30                    | 24         | 2                               | 2         | 2        | -        | 6                 |
|                       | Madhya Pradesh  | 40                    | 39         | -                               | 1         | -        | -        | 1                 |
|                       | Madras          | 60                    | 51         | 6                               | 2         | 1        | -        | 9                 |
|                       | Maharashtra     | 80                    | 79         | 1                               | -         | -        | -        | 1                 |
|                       | Mysore          | 80                    | 67         | 3                               | -         | 5        | -        | 13                |
|                       | Punjab *        | 20                    | 20         | -                               | -         | -        | -        | -                 |
|                       | Rajasthan       | 50                    | 46         | -                               | 4         | -        | -        | 4                 |
|                       | Uttar Pradesh   | 60                    | 39         | 3                               | 7         | -        | 6        | 21                |
| <u>States covered</u> |                 | <u>480</u>            | <u>425</u> | <u>25</u>                       | <u>16</u> | <u>8</u> | <u>6</u> | <u>55</u>         |
| maize                 | Andhra Pradesh  | 30                    | 30         | -                               | -         | -        | -        | -                 |
|                       | Bihar           | 60                    | 49         | -                               | 9         | -        | 2        | 11                |
|                       | Gujarat         | 20                    | 16         | 1                               | 4         | 3        | 2        | 4                 |
|                       | Jammu & Kashmir | 30                    | 25         | 2                               | 3         | -        | -        | 5                 |
|                       | Madhya Pradesh  | 30                    | 28         | 2                               | -         | -        | -        | 2                 |
|                       | Punjab *        | 50                    | 50         | -                               | -         | -        | -        | -                 |
|                       | Rajasthan       | 50                    | 43         | -                               | 3         | 4        | -        | 7                 |
|                       | Uttar Pradesh   | 60                    | 54         | -                               | 4         | 2        | -        | 6                 |
| <u>States covered</u> |                 | <u>330</u>            | <u>295</u> | <u>5</u>                        | <u>19</u> | <u>9</u> | <u>2</u> | <u>35</u>         |
| bajra                 | Andhra Pradesh  | 30                    | 29         | -                               | 1         | -        | -        | 1                 |
|                       | Gujarat         | 50                    | 40         | 5                               | -         | 5        | -        | 10                |
|                       | Madhya Pradesh  | 20                    | 18         | 2                               | -         | -        | -        | 2                 |
|                       | Madras          | 50                    | 43         | 3                               | 3         | 1        | -        | 7                 |
|                       | Maharashtra     | 40                    | 39         | -                               | -         | 1        | -        | 1                 |
|                       | Mysore          | 20                    | 18         | 2                               | -         | -        | -        | 2                 |
|                       | Punjab *        | 30                    | 28         | 2                               | -         | -        | -        | 2                 |
|                       | Rajasthan       | 50                    | 46         | 1                               | 3         | -        | -        | 4                 |
|                       | Uttar Pradesh   | 40                    | 33         | -                               | 7         | -        | -        | 7                 |
| <u>States covered</u> |                 | <u>330</u>            | <u>294</u> | <u>15</u>                       | <u>14</u> | <u>7</u> | <u>-</u> | <u>36</u>         |

\* Pre-reorganised.

## Statement 3: (Contd.)

| crop                  | state           | number of experiments |            | reasons for loss of experiments |           |          |          | total expts. lost |
|-----------------------|-----------------|-----------------------|------------|---------------------------------|-----------|----------|----------|-------------------|
|                       |                 | planned               | received   | A                               | B         | C        | D        |                   |
| (1)                   | (2)             | (3)                   | (4)        | (5)                             | (6)       | (7)      | (8)      | (9)               |
| <u>Rabi</u>           |                 |                       |            |                                 |           |          |          |                   |
| wheat                 | Bihar           | 40                    | 40         | -                               | -         | -        | -        | -                 |
|                       | Gujarat         | 40                    | 33         | 4                               | 3         | -        | -        | 7                 |
|                       | Haryana         | 26                    | 24         | -                               | 2         | -        | -        | 2                 |
|                       | Jammu & Kashmir | 20                    | 16         | -                               | -         | 4        | -        | 4                 |
|                       | Madhya Pradesh  | 50                    | 48         | -                               | -         | -        | 2        | 2                 |
|                       | Maharashtra     | 50                    | 47         | 3                               | -         | -        | -        | 3                 |
|                       | Mysore          | 30                    | 27         | -                               | -         | -        | 3        | 3                 |
|                       | Punjab          | 34                    | 34         | -                               | -         | -        | -        | -                 |
|                       | Rajasthan       | 50                    | 43         | -                               | 6         | -        | 1        | 7                 |
|                       | Uttar Pradesh   | 60                    | 56         | -                               | 2         | 2        | -        | 4                 |
| <u>States covered</u> |                 | <u>400</u>            | <u>368</u> | <u>7</u>                        | <u>13</u> | <u>6</u> | <u>6</u> | <u>32</u>         |
| gram                  | Bihar           | 50                    | 50         | -                               | -         | -        | -        | -                 |
|                       | Haryana         | 46                    | 46         | -                               | -         | -        | -        | -                 |
|                       | Madhya Pradesh  | 60                    | 59         | 1                               | -         | -        | -        | 1                 |
|                       | Maharashtra     | 20                    | 19         | 1                               | -         | -        | -        | 1                 |
|                       | Punjab          | 34                    | 32         | -                               | 2         | -        | -        | 2                 |
|                       | Rajasthan       | 60                    | 56         | -                               | 3         | -        | 1        | 4                 |
|                       | Uttar Pradesh   | 80                    | 68         | 4                               | 5         | 3        | -        | 12                |
| <u>States covered</u> |                 | <u>350</u>            | <u>330</u> | <u>6</u>                        | <u>10</u> | <u>3</u> | <u>1</u> | <u>20</u>         |
| rabi-jowar            | Andhra Pradesh  | 50                    | 40         | -                               | 8         | 2        | -        | 10                |
|                       | Gujarat         | 20                    | 18         | 2                               | -         | -        | -        | 2                 |
|                       | Maharashtra     | 70                    | 66         | 4                               | -         | -        | -        | 4                 |
|                       | Mysore          | 60                    | 50         | 6                               | 4         | -        | -        | 10                |
| <u>States covered</u> |                 | <u>200</u>            | <u>174</u> | <u>12</u>                       | <u>12</u> | <u>2</u> | <u>-</u> | <u>26</u>         |

A: Harvested date not received from primary worker or intimation received late.

B: Harvested earlier than the date fixed.

C: Pre-occupation of central supervisory staff elsewhere for inspection work.

D: Other reasons, such as failure of crop, loss of experimental crop by theft without the knowledge of the cultivator, etc.



Statement 4: Net yield rates (dried grain, Kgs/hectare) Kharif - 1966-67

| state                        | rice          |             |                   | jowar         |             |                   | maize         |             |                   | bajra         |             |                   |
|------------------------------|---------------|-------------|-------------------|---------------|-------------|-------------------|---------------|-------------|-------------------|---------------|-------------|-------------------|
|                              | no. of expts. | yield rates | percen- tage S.E. | no. of expts. | yield rates | percen- tage S.E. | no. of expts. | yield rates | percen- tage S.E. | no. of expts. | yield rates | percen- tage S.E. |
| (1)                          | (2)           | (3)         | (4)               | (5)           | (6)         | (7)               | (8)           | (9)         | (10)              | (11)          | (12)        | (13)              |
| Andhra Pradesh               | 80            | 1436        | 8.1               | 60            | 398         | 16.1              | 30            | 485         | 17.9              | 29            | 527         | 15.1              |
| Assam                        | 56            | 761         | 8.0               | ..            | ..          | ..                | ..            | ..          | ..                | ..            | ..          | ..                |
| Bihar                        | 98            | 412         | 16.6              | ..            | ..          | ..                | 49            | 1022        | 9.4               | ..            | ..          | ..                |
| Gujarat                      | ..            | ..          | ..                | 24            | 226         | 31.2              | 16            | 779         | 19.9              | 40            | 485         | 17.8              |
| Jammu & Kashmir              | ..            | ..          | ..                | ..            | ..          | ..                | 25            | 1316        | 22.2              | ..            | ..          | ..                |
| Kerala                       | 56            | 985         | 7.6               | ..            | ..          | ..                | ..            | ..          | ..                | ..            | ..          | ..                |
| Madhya Pradesh               | 27            | 558         | 23.9              | 39            | 624         | 12.4              | 28            | 620         | 15.2              | 18            | 545         | 29.8              |
| Madras                       | 46            | 1251        | 10.9              | 51            | 571         | 19.7              | ..            | ..          | ..                | 43            | 146         | 18.6              |
| Maharashtra                  | 19            | 933         | 21.4              | 79            | 475         | 10.4              | ..            | ..          | ..                | 39            | 159         | 32.0              |
| Mysore                       | 18            | 1179        | 9.3               | 67            | 397         | 16.0              | ..            | ..          | ..                | 18            | 324         | 18.6              |
| Orissa                       | 67            | 793         | 11.1              | ..            | ..          | ..                | ..            | ..          | ..                | ..            | ..          | ..                |
| Punjab *                     | 20            | 1094        | 16.6              | 20            | 117         | 19.3              | 50            | 891         | 14.0              | 28            | 453         | 18.1              |
| Rajasthan                    | ..            | ..          | ..                | 46            | 401         | 18.3              | 43            | 912         | 15.2              | 46            | 195         | 27.0              |
| Uttar Pradesh                | 60            | 351         | 20.3              | 39            | 518         | 20.9              | 54            | 1010        | 12.8              | 33            | 780         | 25.5              |
| total for all states covered | 547           | 779         | 4.7               | 425           | 456         | 5.7               | 295           | 919         | 5.6               | 294           | 326         | 9.7               |

Pre-reorganised.

Statement 5: Net yield rates (dried grain, Kgs/hectare) Rabi, 1966-67

| state                               | wheat         |             |                 | gram          |             |                 | jowar         |             |                 |
|-------------------------------------|---------------|-------------|-----------------|---------------|-------------|-----------------|---------------|-------------|-----------------|
|                                     | no. of expts. | yield rates | percentage S.E. | no. of expts. | yield rates | percentage S.E. | no. of expts. | yield rates | percentage S.E. |
| (1)                                 | (2)           | (3)         | (4)             | (5)           | (6)         | (7)             | (8)           | (9)         | (10)            |
| Andhra Pradesh                      | ..            | ..          | ..              | ..            | ..          | ..              | 40            | 548         | 19.0            |
| Bihar                               | 40            | 704         | 16.6            | 50            | 239         | 28.0            | ..            | ..          | ..              |
| Gujarat                             | 33            | 1263        | 20.6            | ..            | ..          | ..              | 18            | 469         | 34.3            |
| Haryana                             | 24            | 1299        | 3.8             | 46            | 420         | 26.2            | ..            | ..          | ..              |
| Jammu & Kashmir                     | 16            | 485         | 24.0            | ..            | ..          | ..              | ..            | ..          | ..              |
| Madhya Pradesh                      | 48            | 435         | 14.3            | 59            | 280         | 20.8            | ..            | ..          | ..              |
| Maharashtra                         | 47            | 473         | 13.8            | 19            | 220         | 22.0            | 66            | 636         | 10.4            |
| Mysore                              | 27            | 288         | 29.2            | ..            | ..          | ..              | 50            | 483         | 13.4            |
| Punjab                              | 34            | 1271        | 14.1            | 32            | 924         | 13.4            | ..            | ..          | ..              |
| Rajasthan                           | 43            | 977         | 14.2            | 56            | 358         | 18.5            | ..            | ..          | ..              |
| Uttar Pradesh                       | 56            | 981         | 11.7            | 68            | 366         | 14.8            | ..            | ..          | ..              |
| <b>total for all states covered</b> | <b>368</b>    | <b>9875</b> | <b>5.9</b>      | <b>330</b>    | <b>389</b>  | <b>8.6</b>      | <b>174</b>    | <b>577</b>  | <b>7.4</b>      |

Statement 6: Comparison of net yield rates (Kgs/hectare), state series and from harvest stage - inspection data, kharif, 1966-67

| state                           | rice                            |            |                                | jowar                           |            |                                | maize                           |            |                                | bajra                           |            |                                |
|---------------------------------|---------------------------------|------------|--------------------------------|---------------------------------|------------|--------------------------------|---------------------------------|------------|--------------------------------|---------------------------------|------------|--------------------------------|
|                                 | net yield rates<br>state-series | Inspection | per-centage<br>diffe-<br>rence | net yield rates<br>state-series | Inspection | per-centage<br>diffe-<br>rence | net yield rates<br>state-series | Inspection | per-centage<br>diffe-<br>rence | net yield rates<br>state-series | Inspection | per-centage<br>diffe-<br>rence |
| (1)                             | (2)                             | (3)        | (4)                            | (5)                             | (6)        | (7)                            | (8)                             | (9)        | (10)                           | (11)                            | (12)       | (13)                           |
| Andhra Pradesh                  | 1354                            | 1436       | - 6.1                          | 425                             | 398        | 6.4                            | 682                             | 485        | 28.9                           | 511                             | 527        | - 3.1                          |
| Assam                           | 883                             | 761        | 13.8                           | ..                              | ..         | ..                             | ..                              | ..         | ..                             | ..                              | ..         | ..                             |
| Bihar                           | 349                             | 412        | -18.0                          | ..                              | ..         | ..                             | 1126                            | 1022       | 9.2                            | ..                              | ..         | ..                             |
| Gujarat                         | ..                              | ..         | ..                             | 196                             | 226        | -15.3                          | 648                             | 779        | -20.2                          | 478                             | 485        | - 1.5                          |
| Jammu & Kashmir                 | ..                              | ..         | ..                             | ..                              | ..         | ..                             | 922                             | 1316       | -42.7                          | ..                              | ..         | ..                             |
| Kerala                          | 1363                            | 985        | 27.7                           | ..                              | ..         | ..                             | ..                              | ..         | ..                             | ..                              | ..         | ..                             |
| Madhya Pradesh                  | 464                             | 558        | -20.3                          | 600                             | 624        | - 4.0                          | 813                             | 620        | 23.7                           | 861                             | 545        | 36.7                           |
| Madras                          | 1546                            | 1251       | 19.1                           | 751                             | 571        | 24.0                           | ..                              | ..         | ..                             | @606                            | @146       | 75.9                           |
| Maharashtra                     | 814                             | 933        | -14.6                          | 529                             | 475        | 10.2                           | ..                              | ..         | ..                             | 234                             | 159        | 32.1                           |
| Mysore                          | 1490                            | 1179       | 20.9                           | 484                             | 397        | 18.0                           | ..                              | ..         | ..                             | 274                             | 324        | -18.2                          |
| Orissa                          | 871                             | 793        | 9.0                            | ..                              | ..         | ..                             | ..                              | ..         | ..                             | ..                              | ..         | ..                             |
| Punjab *                        | 1178                            | 1094       | 7.1                            | 184                             | 177        | 3.8                            | 1328                            | 891        | 32.9                           | 485                             | 453        | 6.6                            |
| Rajasthan                       | ..                              | ..         | ..                             | 304                             | 401        | -31.9                          | 829                             | 912        | -10.0                          | 245                             | 195        | 20.4                           |
| Uttar Pradesh                   | 456                             | 351        | 23.0                           | 400                             | 518        | -29.5                          | 846                             | 1010       | -19.4                          | 507                             | 780        | -53.8                          |
| total for all<br>states covered | 826                             | 779        | 5.7                            | 465                             | 456        | 1.9                            | 934                             | 919        | 1.6                            | 356                             | 326        | 8.4                            |
| Excluding Madras                | ..                              | ..         | ..                             | ..                              | ..         | ..                             | ..                              | ..         | ..                             | 347                             | 333        | 4.0                            |

\* Pre-reorganised.

@ For un-irrigated bajra only.

Statement: 7: Comparison of net yield rates (Kgs/hectare), state series and from harvest stage - inspection data, Rabi, 1966-67.

| state                       | wheat           |                 |                                    | gram            |                 |                                    | jowar           |                 |                                    |
|-----------------------------|-----------------|-----------------|------------------------------------|-----------------|-----------------|------------------------------------|-----------------|-----------------|------------------------------------|
|                             | net yield rates |                 | percen-<br>tage<br>diffe-<br>rence | net yield rates |                 | percen-<br>tage<br>diffe-<br>rence | net yield rates |                 | percen-<br>tage<br>diffe-<br>rence |
|                             | state<br>series | inspec-<br>tion |                                    | state<br>series | inspec-<br>tion |                                    | state<br>series | inspec-<br>tion |                                    |
| (1)                         | (2)             | (3)             | (4)                                | (5)             | (6)             | (7)                                | (8)             | (9)             | (10)                               |
| Andhra Pradesh              | ..              | ..              | ..                                 | ..              | ..              | ..                                 | 741             | 548             | 26.0                               |
| Bihar                       | 516             | 704             | -36.4                              | 288             | 239             | 17.0                               | ..              | ..              | ..                                 |
| Gujarat                     | 992             | 1263            | -27.3                              | ..              | ..              | ..                                 | 681             | 469             | 31.1                               |
| Haryana                     | 1428            | 1299            | 9.0                                | 500             | 420             | 16.0                               | ..              | ..              | ..                                 |
| Jammu & Kashmir             | 600             | 485             | 19.2                               | ..              | ..              | ..                                 | ..              | ..              | ..                                 |
| Madhya Pradesh              | 482             | 435             | 9.8                                | 369             | 280             | 24.1                               | ..              | ..              | ..                                 |
| Maharashtra                 | 410             | 473             | -15.4                              | 309             | 220             | 28.8                               | 513             | 636             | -24.0                              |
| Mysore                      | 265             | 288             | - 8.7                              | ..              | ..              | ..                                 | 467             | 483             | 3.4                                |
| Punjab                      | 1514            | 1271            | 16.1                               | 801             | 924             | -15.4                              | ..              | ..              | ..                                 |
| Rajasthan                   | 907             | 977             | - 7.7                              | 331             | 358             | - 8.2                              | ..              | ..              | ..                                 |
| Uttar Pradesh               | 960             | 981             | - 2.2                              | 414             | 366             | 11.6                               | ..              | ..              | ..                                 |
| total for<br>states covered | 884             | 875             | 1.0                                | 427             | 389             | 8.9                                | 552             | 577             | -4.5                               |

Appendix - I

Statement giving shape and size of plots adopted for crop estimation surveys in different States and agencies for field work for the States and crops covered by the harvest-stage inspection programme

| State           | Agency for field work             | crops covered  | shape of plot | size of the plot           |
|-----------------|-----------------------------------|--|---------------|----------------------------|
| 1               | 2                                 | 3  | 4             | 5                          |
| Andhra Pradesh  | revenue, agriculture & statistics | paddy, kharif jowar, rabi jowar, maize & bajra       | rect.         | 1/100th acre (33' x 13.2') |
| Assam           | special (statistical staff)       | paddy  | square        | 1/160th acre (16½' x 16½') |
| Bihar           | revenue and development           | paddy, maize, wheat & gram                           | rect.         | 1/80th acre (33' x 16½')   |
| Gujarat         | revenue and development           | kharif jowar, maize, bajra, wheat & rabi jowar       | square        | 1/40th acre (33' x 33')    |
| Haryana         | revenue and agriculture           | wheat & gram   | rect.         | 1/80.9th acre (10m x 5m)   |
| Jammu & Kashmir | revenue                           | maize & wheat  | rect.         | 1/80th acre (33' x 16½')   |
| Kerala          | special (statistical staff)       | paddy  | square        | 1/161.9th acre (5m x 5m)   |
| Madhya Pradesh  | revenue                           | paddy, kharif jowar, bajra, maize, wheat & gram      | rect.         | 1/80th acre (33' x 16½')   |
| Madras          | revenue and agriculture           | paddy, kharif jowar & bajra                          | rect.         | 1/100th acre (33' x 13.2') |
| Maharashtra     | revenue & development             | paddy, kharif jowar, bajra, wheat gram & rabi jowar. | square        | 1/40.5th acre (10m x 10m)  |

Appendix I: (Contd.)

| state         | Agency for field work                         | crops covered                                     | shape of plot        | size of the plot   |
|---------------|---|---|----------------------|--|
| 1             | 2   | 3   | 4                    | 5  |
| Mysore        | revenue and agriculture                       | paddy, kharif jowar, bajra, wheat & rabi jowar.   | rect.                | 1/80.9th acre (10m x 5m)   |
| Orissa        | special staff amin (Department of Statistics) | paddy   | circle               | 1/866.3th acre (radius of 4')  |
| Punjab        | revenue and agriculture                       | paddy, maize, wheat & gram                        | rect.                | 1/80.9th acre (10m x 5m)<br><br>1/135th acre (10m x 3m) in hilly areas |
| Rajasthan     | revenue                                       | kharif jowar, maize, bajra & wheat                | rect.                | 1/80th acre (33' x 16½')   |
| Uttar Pradesh | revenue                                       | paddy, kharif jowar, maize, bajra, wheat and gram | equilateral triangle | 1/93.4th acre (10 metres side)   |

APPENDIX IICentral Driage Experiments, 1966-67

1. The Directorate of NSS initiated the programme of central driage experiments in 1960-61 on a small scale at the Headquarters (New Delhi). This established the feasibility of carrying out central driage operations at a suitable central place. The central driage experiments were taken up on regular basis from 1961-62 so that driage ratios calculated from them could be readily available for obtaining yield rates in terms of dried grains from the data of experiments inspected under the harvest-stage inspection programme for which weights of the green produce had been reported by the supervisors.

2. Scale of work: During 1966-67 the supervisors were required to conduct crop cutting experiments in plots of size 5m x 5m square in some of the fields selected for harvest stage inspection. They were asked to mail to the headquarters a sample of 2 kilograms of produce for Jowar, bajra and maize and 1 kilogram of paddy, wheat and gram obtained from each of the square cuts for the purpose of central driage experiments, at Faridabad. The produce was received for a total of 744 experiments in kharif season and 577 experiments in Rabi season. Of these 54 in kharif (out of 744) and 29 in Rabi (out of 577) were rejected on account of damage in transit or otherwise not conforming to requirements.

3. Procedure for despatch of bags: The produce for driage experiments at Faridabad had to be properly sealed in cloth bag of white drill and mailed as a Registered parcel. The contents of the produce consisted of cobs for

jowar, maize and bajra and grain for paddy, wheat and gram.

4. Driage procedure followed at headquarters: The procedure followed for the conduct of these experiments at the headquarters is indicated below:

- (i) Examination of the contents and taking weight to the nearest 5 grams as soon as the bag was received. The weight of the empty bag was also noted.
- (ii) The produce was thereafter put in the bag and the closed bag was exposed to the sun daily (excluding rainy days and holidays). The bag was exposed till a constant weight was attained in three consecutive weighments. Weighments were taken on alternate days.
- (iii) When constancy had been attained the bag was opened and the weight of dried produce noted.
- (iv) In the case of cobs the produce was threshed and cleaned. The cleaned grain was again exposed to the sun till its weight became steady.

5. Arrangements for storage and driage:- For the purpose of storing the bags, a steel Godrej rack covered with a frame of wire netting was kept in a hall. This protected the produce from any possible damage from rats etc. The bags were exposed to the sun daily by placing them on a tarpaulin and covered with hen-cooplike frame of wire netting. This arrangement kept the produce free from damage by birds etc. and at the same time obviated the necessity for a whole-time worker to keep watch on them. The weights were taken with the help of a counter-balance, which considerably quickened the weighing operations.

6. Results:- Table A.II enclosed gives state-wise and cropwise driage ratios used for this report together with the source of information.



Statement - AII: Crop-wise driage ratios used along with the source, harvest-stage inspection, 1966-67.

| state           | Kharif food crops |             |              |             |              |               |              |             |   |   |
|-----------------|-------------------|-------------|--------------|-------------|--------------|---------------|--------------|-------------|---|---|
|                 | paddy             |             | jowar        |             | maize        |               | bajra        |             |   |   |
|                 | driage ratio      | source      | driage ratio | source      | driage ratio | source        | driage ratio | source      |   |   |
| (1)             | (2)               | (3)         | (4)          | (5)         | (6)          | (7)           | (8)          | (9)         |   |   |
| Andhra Pradesh  | 0.8532            | CDE 1966-67 | 0.6013       | CDE 1966-67 | 0.4976       | State 1965-66 | 0.5710       | CDE 1966-67 |   |   |
| Assam           | 0.8270            | CDE 1964-65 | -            | -           | -            | -             | -            | -           | - | - |
| Bihar           | 0.8413            | CDE 1966-67 | -            | -           | 0.4372       | CDE 1966-67   | -            | -           | - | - |
| Gujarat         | -                 | -           | 0.5453       | CDE 1966-67 | 0.3924       | CDE 1966-67   | 0.5291       | CDE 1966-67 |   |   |
| Jammu & Kashmir | -                 | -           | -            | -           | 0.4717       | CDE 1966-67   | -            | -           | - | - |
| Kerala          | 0.8420            | CDE 1964-65 | -            | -           | -            | -             | -            | -           | - | - |
| Madhya Pradesh  | 0.8702            | CDE 1966-67 | 0.5297       | CDE 1966-67 | 0.3801       | CDE 1966-67   | 0.5446       | CDE 1966-67 |   |   |
| Madras          | 0.8770            | CDE 1966-67 | 0.6659       | CDE 1966-67 | -            | -             | 0.4765       | CDE 1966-67 |   |   |
| Maharashtra     | 0.8550            | CDE 1966-67 | 0.5859       | CDE 1966-67 | -            | -             | 0.5370       | CDE 1966-67 |   |   |
| Mysore          | 0.8699            | CDE 1966-67 | 0.5436       | CDE 1966-67 | -            | -             | 0.6084       | CDE 1966-67 |   |   |
| Orissa          | 0.8887            | CDE 1963-64 | -            | -           | -            | -             | -            | -           | - | - |
| Punjab *        | 0.8259            | CDE 1966-67 | 0.5609       | CDE 1966-67 | 0.3800       | CDE 1966-67   | 0.4679       | CDE 1966-67 |   |   |
| Rajasthan       | -                 | -           | 0.5461       | CDE 1966-67 | 0.4933       | CDE 1966-67   | 0.5809       | CDE 1966-67 |   |   |
| Uttar Pradesh   | 0.8576            | CDE 1966-67 | 0.5525       | CDE 1966-67 | 0.4674       | CDE 1966-67   | 0.5427       | CDE 1966-67 |   |   |

\* Pre-reorganised.

Appendix - II (Contd.)

**Statement A.II (Contd.) Crop-wise drriage ratios used along with the source, harvest stage inspection, 1966-67.**

| state          | rabi food crops |                |               |             |               |             |
|----------------|-----------------|----------------|---------------|-------------|---------------|-------------|
|                | wheat           |                | gram          |             | rabi-jowar    |             |
|                | drriage ratio   | source         | drriage ratio | source      | drriage ratio | source      |
| 1              | 10              | 11             | 12            | 13          | 14            | 15          |
| Andhra Pradesh | -               | -              | -             | -           | 0.6662        | CDE 1966-67 |
| Bihar          | 0.8863          | CDE 1966-67    | 0.9039        | CDE 1966-67 | -             | -           |
| Gujar          | 0.9573          | CDE 1966-67    | -             | -           | 0.5251        | CDE 1966-67 |
| Harya:         | 0.9506          | CDE 1966-67    | 0.9215        | CDE 1966-67 | -             | -           |
| Jammu Kashmir  | 0.9169          | CDE 1966-67    | -             | -           | -             | -           |
| Madhya Pradesh | 0.9363          | CDE 1966-67    | 0.9618        | CDE 1966-67 | -             | -           |
| Maharashtra    | 0.9427          | CDE 1966-67    | 0.9421        | CDE 1966-67 | 0.6117        | CDE 1966-67 |
| Mysore         | 0.9000          | (State)1965-66 | -             | -           | 0.5633        | CDE 1966-67 |
| Punjab         | 0.9399          | CDE 1966-67    | 0.9380        | CDE 1966-67 | -             | -           |
| Rajasthan      | 0.9470          | CDE 1966-67    | 0.9450        | CDE 1966-67 | -             | -           |
| Uttar Pradesh  | 0.9265          | CDE 1966-67    | 0.8915        | CDE 1966-67 | -             | -           |

## B. Surveys for Estimation of Crop Areas

### B.I.—Sample surveys for pre-harvest (advance) estimates of crop acreages

- B.1.1. . . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1955-56.
- B.1.2. . . . . Report on the sample surveys for pre-harvest (advance) estimates of crop acreages, 1956-57 and 1957-58.
- B.1.3. . . . . Report on the sample check of field work of the sample survey for pre-harvest (advance) estimates of crop acreages, 1957-58.
- B.1.4. . . . . Report on the sample survey for pre-harvest (advance) estimates of crop acreages, 1958-59.
- B.1.5. . . . . Review of sample surveys for pre-harvest (advance) estimates of crop acreages, 1953-54 to 1959-60.

## C. Surveys in Development Areas

### C.1. Crop estimation surveys

- C.1.1. . . . . Report on the crop estimation survey in development areas, Rabi, 1954-55.
- C.1.2. . . . . Report on the crop estimation survey in development areas, 1955-56.
- C.1.3. . . . . Report on the crop estimation survey in development areas, 1956-57.
- C.1.4. . . . . Report on the crop estimation survey in development areas, 1957-58.
- C.1.5. . . . . Report on the crop estimation survey in development areas, Kharif, 1958-59.
- C.1.6. . . . . Report on the crop estimation survey in development areas, Rabi, 1958-59.
- C.1.7. . . . . Report on the crop estimation survey in development areas, 1959-60.
- C.1.8. . . . . Review of crop estimation surveys in development areas, 1955-56 to 1959-60.

### C.2. Estimation of area brought under improved agricultural practices

- C.2.1. . . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Andhra Pradesh, Kharif, 1958-59.
- C.2.2. . . . . Report on the pilot survey for estimation of area brought under improved agricultural practices, Uttar Pradesh, Rabi 1958-59.
- C.2.3. . . . . Consolidated results of surveys for estimation of area brought under improved agricultural practices, 1961-62.
- C.2.4. . . . . Consolidated results of surveys for estimation of area benefited by improved agricultural practices, 1962-63.
- C.2.5. . . . . Consolidated results of surveys for estimation of area benefited by improved agricultural practices, 1963-64.
- C.2.6. . . . . Consolidated results of surveys for estimation of area benefited by improved agricultural practices, 1964-65.

## D. Surveys for Estimating Benefits of Irrigation

### D.1. Area benefited by minor irrigation works.

- D.1.1. . . . . Review of minor irrigation assessment surveys, 1951-52 to 1959-60.
- D.1.2. . . . . Report on the sample survey for the assessment of the utilisation of tubewells, 1957-58.
- D.1.3. . . . . Report on the sample check of new wells (G.M.F.) Rajasthan, 1959.
- D.1.4. . . . . Report on the check of minor irrigation works in development areas, Rajasthan, 1959.
- D.1.5. . . . . Report on the check of minor irrigation works in development areas, Bihar, 1959.

## E. In-service Training of Staff

- E.1. . . . . Note on the in-service training of staff.
- E.2. . . . . Report on stage II training, Poona, 1961.
- E.3. . . . . Report on stage II training, Delhi, 1961.
- E.4. . . . . Report on stage III training, Delhi, 1961.
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- E.6. . . . . Report on stage III training, Delhi, 1963.
- E.7. . . . . Report on stage II training Bangalore, 1965.
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- F.1. . . . . Review of the sample surveys for estimating the catch of marine fish, 1950 to 1956
- F.2. . . . . Report on the pilot survey of inland fisheries, Orissa, 1962-63.

## M. Miscellaneous

- M.1. . . . . Report on the surveys for assessment of additional yield from land reclaimed by Central Tractor Organisation, 1951-52 to 1954-55.

# DIRECTORATE OF NATIONAL SAMPLE SURVEY

(Agricultural Statistics Division)

## List of Publications

### A. Crop Estimation Surveys (State Series)

#### A.1. Annual results

- A.1.1. Consolidated results of crop estimation surveys on principal food crops, 1955-56.
- A.1.2. Consolidated results of crop estimation surveys on principal food crops, 1956-57.
- A.1.3. Consolidated results of crop estimation surveys on principal food crops, 1957-58.
- A.1.4. Consolidated results of crop estimation surveys on principal non-food crops, 1957-58.
- A.1.5. Consolidated results of crop estimation surveys on principal food crops, 1958-59.
- A.1.6. Consolidated results of crop estimation surveys on principal non-food crops, 1958-59.
- A.1.7. Consolidated results of crop estimation surveys on principal food crops, 1959-60.
- A.1.8. Consolidated results of crop estimation surveys on principal non-food crops, 1959-60.
- A.1.9. Consolidated results of crop estimation surveys on principal food crops, 1960-61.
- A.1.10. Consolidated results of crop estimation surveys on principal non-food crops, 1960-61.
- A.1.11. Consolidated results of crop estimation surveys on principal food crops, 1961-62.
- A.1.12. Consolidated results of crop estimation surveys on principal non-food crops, 1961-62.
- A.1.13. Consolidated results of crop estimation surveys on principal food crops, 1949-50 to 1960-61.
- A.1.14. Consolidated results of crop estimation surveys on principal food crops, 1962-63.
- A.1.15. Consolidated results of crop estimation surveys on principal non-food crops, 1962-63.
- A.1.16. Consolidated results of crop estimation surveys on principal crops, 1963-64.
- A.1.17. Consolidated results of crop estimation surveys on principal crops, 1964-65.
- A.1.18. Consolidated results of crop estimation surveys on principal crops, 1965-66.

#### A.2. Supervision of crop cutting experiments

- A.2.1. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Kharif, 1960-61.
- A.2.2. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Rabi, 1960-61.
- A.2.3. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1961-62.
- A.2.4. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1962-63.
- A.2.5. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1963-64.
- A.2.6. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1964-65.
- A.2.7. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1965-66.
- A.2.8. Report on the special supervisory check on crop estimation surveys on cotton, 1964-65.
- A.2.9. Report on the special supervisory check on crop estimation surveys on cotton, 1965-66.
- A.2.10. Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1966-67.
- A.2.11. Report on special supervisory check on crop estimation surveys on cotton, 1966-67.

#### A.3. Special studies

- A.3.1. Report on Central drriage experiments, 1960-61.
- A.3.2. Report on the joint crop cutting studies at Bundi (Rajasthan), Kharif, 1960-61.
- A.3.3. Report on the joint crop cutting studies at Barh (Bihar), Rabi, 1960-61.
- A.3.4. Report on Central drriage experiments, 1961-62.
- A.3.5. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1960-61 and 1961-62.
- A.3.6. Report on Central drriage experiments, 1962-63.
- A.3.7. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1962-63.
- A.3.8. Report on Central drriage experiments, 1963-64.
- A.3.9. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1963-64.
- A.3.10. Report on Central drriage experiments at NSS block offices, 1962-63.
- A.3.11. Report on Type-2 study on maize, Bihar, 1963-64.
- A.3.12. Report on Type-2 study on paddy, Andhra Pradesh, 1963-64.
- A.3.13. Report on Type-2 study on wheat, Uttar Pradesh, 1964-65.
- A.3.14. Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1964-65.
- A.3.15. Report on Central drriage experiments, 1964-65.
- A.3.16. Report on Central drriage experiments, 1965-66.
- A.3.17. Report on square cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1965-66.
- A.3.18. Report on Type-2 study on jowar (Kharif), Mysore, 1965-66.
- A.3.19. Report on Central drriage experiments, 1966-67.
- A.3.20. Report on square cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1966-67.

**CROP ESTIMATION SURVEYS (STATE SERIES)**

**REPORT ON INSPECTION OF CROP CUTTING EXPERIMENTS  
AT HARVEST STAGE ON A RANDOMISED BASIS, 1967-68.**

**SERIES**

**A-2**

**No. 13**

**DIRECTORATE OF NATIONAL SAMPLE SURVEY**  
**(Agricultural Statistics Division)**  
**1969**

## FOREWORD

An essential aspect of the programme of crop estimation surveys on principal crops organised by the States is the inspection of field work by a central team of supervisors, intended largely for ensuring uniformity in concepts, definitions and other details of the surveys for facilitating inter-state comparability and all-India consolidation. Since 1960-61, a part of the inspection is organised at harvest on a pre-assigned sample of villages designed to furnish independent estimates of yield rate at the all-India level in respect of a few selected crops. This report presents the results of inspection carried out during 1967-68.



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# REPORT ON THE INSPECTION OF CROP CUTTING EXPERI- MENTS AT HARVEST STAGE ON RANDOMISED BASIS 1967-68

## 1. Introduction

1.1 As an integral part of its role to offer technical guidance and coordination of the results of crop estimation surveys, carried out by the States, the Directorate of National Sample Survey (NSS) organises inspection of field work by a central team of supervisors, intended largely for ensuring uniformity in concepts, definitions and other details as also inter-state comparability from the point of view of all-India consolidation. Since 1960-61 a part of the inspection carried out by the central supervisory staff has been randomised to provide for inspection at harvest in a pre-assigned sample of villages for a few selected crops. The main object of the programme is to provide an independent estimate of yield rate at the all-India level with a reasonable degree of precision. Results of the programme during the initial years were quite encouraging and this programme has now become a regular part of the annual inspection programme of the central supervisory staff. The present report deals with results of inspection carried out during 1967-68.

## 2. Coverage

2.1 Consistent with the availability of staff resources, the NSS envisaged a programme of randomised inspection to fulfil the object of obtaining precise estimates of yield

rates at all-India level of crops, based on inspection at harvest in order that real difference, if any, between such estimates and estimates based on overall data could be assessed statistically. A review of such a study made during the initial years revealed that absolute difference, although large between the two sets of estimates, turned out to be statistically not significant because of the magnitude of the associated sampling errors. Accordingly, during 1965-66 the programme was re-oriented to cover only a few crops but on an intensive scale, with the available staff resources. A similar plan was drawn up for 1967-68 also.

2.2 The states and crops covered by the programme are shown in the table O.1 below:-

Table O.1: Percentage of all-India official estimate of production (1966-67) by states

A - KHARIF

| state              | paddy | jowar | maize | bajra |
|--------------------|-------|-------|-------|-------|
| 1                  | 2     | 3     | 4     | 5     |
| 1. Andhra Pradesh  | 16    | 9     | 5     | 7     |
| 2. Assam           | 6     | -     | -     | -     |
| 3. Bihar           | 5     | -     | 20    | -     |
| 4. Gujarat         | -     | 5     | 3     | 18    |
| 5. Haryana         | 1     | 1     | -     | 8     |
| 6. Jammu & Kashmir | -     | -     | 4     | -     |
| 7. Kerala          | 4     | -     | -     | -     |
| 8. Madhya Pradesh  | 6     | 25    | 9     | 4     |
| 9. Madras          | 14    | 7     | -     | 8     |
| 10. Maharashtra    | 4     | 28    | -     | 9     |
| 11. Mysore         | 5     | 11    | -     | 3     |
| 12. Orissa         | 12    | -     | -     | -     |
| 13. Punjab         | -     | -     | 12    | -     |
| 14. Rajasthan      | -     | 7     | 12    | 27    |
| 15. Uttar Pradesh  | 7     | 7     | 21    | 11    |
| Total              | 81    | 100   | 86    | 95    |



Table O.1: (contd.) Percentage of all-India official estimate of production (1966-67) by states.

B - RABI

| state              | wheat | gram | jowar |
|--------------------|-------|------|-------|
| 1                  | 2     | 3    | 4     |
| 1. Andhra Pradesh  | -     | -    | 26    |
| 2. Bihar           | 4     | 2    | -     |
| 3. Gujarat         | 4     | -    | 3     |
| 4. Haryana         | 9     | 15   | -     |
| 5. Jammu & Kashmir | 1     | -    | -     |
| 6. Madhya Pradesh  | 9     | 16   | -     |
| 7. Maharashtra     | 3     | 3    | 47    |
| 8. Mysore          | 1     | -    | 20    |
| 9. Punjab          | 22    | 14   | -     |
| 10. Rajasthan      | 8     | 15   | -     |
| 11. Uttar Pradesh  | 37    | 28   | -     |
| Total              | 98    | 93   | 96    |

It may be seen from the above table that spot check covered 15 states during the kharif and 11 during the rabi season. For all crops, states covered by the programme accounted for more than 80 per cent of the production for the respective crops, at the all-India level.

3. Sampling design

3.1 The design adopted for crop estimation surveys (except Kerala and Orissa) is one of stratified random sampling with tehsil/revenue inspector circles as strata, villages within a stratum as primary sampling units, fields within each selected village as sampling units at the second stage, and, finally, a plot of specified size as ultimate unit of sample. The allocation of experiments for a crop among strata is generally made on the joint

consideration of acreage under the crop and the number of primary workers available in each stratum such that work load generally for a number of the field staff can easily be managed in the course of other departmental duties. As a general basis, about 100 to 120 experiments are planned in each of major crop growing districts. The experiments in the minor districts are so adjusted that the precision of the estimates for the divisions and the state as a whole is generally high. In each selected village, two fields growing the experimental crop are selected and in each of them one experimental plot of prescribed size marked at random for sample harvest. The shape and size of the plot varied from state to state and may be seen in appendix I. The measurement of yield of a crop within a sample field (usually known as a crop cutting experiment) consists in locating and marking of a plot of the prescribed size in the sample field, harvesting and threshing the produce within it and recording the weight of the produce. In a sub-sample of cases, the produce harvested from the experimental plot is also dried and processed further for determining percentage recovery of dried grain from the harvested produce.

3.2 The design adopted for the survey in Kerala and Orissa is slightly different. In Kerala, talukas form the strata, from each of which 6 villages are chosen at random. In each village 3 plots are selected by systematic random sampling for crop cutting experiments. In Orissa, the strata are formed by grouping contiguous

police stations on the basis of geographical area and topographical features. Out of the villages selected for the area enumeration work, a sub-sample of villages is selected for crop cutting experiments, 2 to 3 cuts being planned in each village.

3.3 The field work of the survey, comprising selection of field and conduct of experiments therein, is entrusted to the staff of the state department of revenue and/or agriculture or statistics depending on the work load and administrative convenience.

3.4 The spot check was organised in a sub-sample of fields selected randomly out of those chosen in the state series for yield observation. For this purpose, requisite number of villages corresponding to half the number of experiments proposed for inspection for each crop in each state (except for Kerala and Orissa) were selected with equal probability and without replacement from the list of villages selected for state series. In the states, where the practice of selecting common villages for different crops was in vogue, the procedure prescribed for selecting villages for the spot check, as in the earlier years, made use of these common villages as far as possible for selecting a sub-sample. It was ensured that the spot check covered the entire state.

#### 4. Sample size

4.1 A sample of 2,690 (1,740 on kharif crops, including 30 experiments on tabi paddy in Andhra Pradesh and 950 on rabi crops) was proposed to be covered under this programme

on specified crops. Statewise and cropwise distribution is given below in table 0.2.

Table 0.2: Sample size and distribution of work among supervisors

A - KHARIF

| state              | number of super-<br>visors | number of expts. (@ 2 per<br>village) proposed for<br>inspection at harvest<br>stage |            |            |            |             | average<br>number of<br>experi-<br>ments per<br>supervisor |
|--------------------|----------------------------|--|------------|------------|------------|-------------|--|
|                    |                            | paddy  | jowar      | maize      | bajra      | total       |  |
| (1)                | (2)                        | (3)  | (4)        | (5)        | (6)        | (7)         | (8)  |
| 1. Andhra Pradesh  | 7                          | 80*  | 60         | 30         | 30         | 200         | 29   |
| 2. Assam           | 4                          | 60   | -          | -          | -          | 60          | 15   |
| 3. Bihar           | 10                         | 100  | -          | 60         | -          | 160         | 16   |
| 4. Gujarat         | 6                          | -  | 30         | 20         | 50         | 100         | 17   |
| 5. Haryana         | -                          | 20   | 20         | -          | 30         | 70          | 14   |
| 6. Jammu & Kashmir | 2                          | -  | -          | 30         | -          | 30          | 15   |
| 7. Kerala          | 2                          | 60   | -          | -          | -          | 60          | 30   |
| 8. Madhya Pradesh  | 7                          | 30   | 40         | 30         | 20         | 120         | 17   |
| 9. Madras          | 7                          | 50   | 60         | -          | 50         | 160         | 23   |
| 10. Maharashtra    | 9                          | 20   | 80         | -          | 40         | 140         | 16   |
| 11. Mysore         | 8                          | 20   | 80         | -          | 20         | 120         | 15   |
| 12. Orissa         | 4                          | 70   | -          | -          | -          | 70          | 18   |
| 13. Punjab         | 9                          | 20   | -          | 50         | -          | 70          | 18   |
| 14. Rajasthan      | 9                          | -  | 50         | 50         | 50         | 150         | 17   |
| 15. Uttar Pradesh  | 13                         | 70   | 60         | 60         | 40         | 230         | 18   |
| <b>Total</b>       | <b>97</b>                  | <b>600</b>   | <b>480</b> | <b>230</b> | <b>330</b> | <b>1740</b> | <b>18</b>  |

\* Includes 30 experiments planned for tabi paddy.

Table 0.2 (contd.): Sample size and distribution of work among supervisorsB - RABI

| state              | number of supervisors | number of experiments (@ 2 per village) proposed for inspection at harvest stage |      |       |       | average number of experiments per supervisor |
|--------------------|-----------------------|--|------|-------|-------|--|
|                    |                       | wheat  | gram | jowar | total |  |
| 1                  | 2                     | 3  | 4    | 5     | 6     | 7  |
| 1. Andhra Pradesh  | 7                     | -  | -    | 50    | 50    | 7  |
| 2. Bihar           | 10                    | 40   | 50   | -     | 90    | 9  |
| 3. Gujarat         | 6                     | 40   | -    | 20    | 60    | 10   |
| 4. Haryana         | -                     | 20   | 50   | -     | 70    | 14   |
| 5. Jammu & Kashmir | 2                     | 20   | -    | -     | 20    | 10   |
| 6. Madhya Pradesh  | 7                     | 50   | 60   | -     | 110   | 16   |
| 7. Maharashtra     | 9                     | 50   | 20   | 70    | 140   | 16   |
| 8. Mysore          | 8                     | 30   | -    | 60    | 90    | 11   |
| 9. Punjab          | 9                     | 40   | 30   | -     | 70    | 18   |
| 10. Rajasthan      | 9                     | 50   | 60   | -     | 110   | 12   |
| 11. Uttar Pradesh  | 13                    | 60   | 80   | -     | 140   | 11   |
| Total              | 80                    | 400  | 350  | 200   | 950   | 12   |

The plan provided for inspection of about 600 experiments for paddy, 500 for kharif jowar, 400 for wheat and about 350 for maize, bajra and gram and 200 for rabi jowar. The scale of inspection at harvest during 1967-68 was practically of the same order as that for 1966-67.

5. Personnel

5.1 In all, 97 and 80 supervisors of the Agricultural Statistics Division of the Directorate of National Sample Survey, distributed over different states in kharif and rabi seasons of 1967-68 respectively, were entrusted with inspection programme. The supervisors had considerable experience in this type of work and were adequately trained in the operation of the programme. The programme in each state was

formulated, supervised and co-ordinated by the Officer-in-charge in each state. Officers from the headquarters of this Directorate were also associated for providing necessary guidance.

#### 6. Item of work

6.1 The programme of spot check envisaged selection of village at the regional offices in the states from the list of villages selected for the state-series for crop estimation surveys. These were provided by the respective state statistical bureau or offices of the state agricultural statisticians. The spot check consisted, in the main, of getting the state primary workers to visit the selected villages and fields at the appropriate time during the season and ensuring that they marked and harvested plot of the prescribed size in accordance with the instructions and reported the weight of clean harvested produce correctly in the schedules for all the experiments planned for the programme.

6.2 The field work of crop cutting experiments is carried out in three stages. During the first stage, the work relates to identification of sample villages, selection of fields for yield observation in accordance with the procedure prescribed and fixing the dates of harvest for sample fields in consultation with the cultivators. The field work at the second stage is carried out on the harvesting day and consists of demarcating the area of plot within the selected field starting from a randomly located point, and taking yield observations therefrom. In the third stage

of the work, which is done on a sub-sample of yield measurements, the weight of the dried grain is taken after proper processing.

6.3 The central supervisory staff carried out inspection at one or more of the stages of the field work mentioned above. For the pre-assigned programme of inspection, the main emphasis is on the observation at the harvest-stage. Preliminary visits to the sample villages when made, were for the purpose of obtaining dates of harvest of the selected fields, besides checking the accuracy of selection of fields. However, such visits had progressively been reduced, thanks to the organisation by the State Departments who had made suitable arrangements for communicating harvest dates of sample fields to the central team of supervisors sufficiently in good time. However, in the absence of any special arrangements for obtaining the harvest dates, preliminary visits were paid to the sample villages to avoid loss of experiments for inspection at harvest. All possible steps were taken to ensure that the central supervisory staff cover all the experiments planned under the pre-assigned programme.

6.4 The main aspect of inspection of field work consisted in visiting the selected villages on the appropriate day fixed for harvest of sample fields, in ensuring the accuracy in the conduct of crop cutting experiments and finally in obtaining the weight of the green produce. The harvested produce was in the form of cobs for jowar (kharif and rabi), bajra and maize and grain for paddy,

wheat and gram. It was ensured that the field work pertaining to the observation on field, removal of grain and recording of its weight, even if it involved a prolonged stay in a village or even a repeat visit to the village, was carried out scrupulously by the supervisory staff. Further, sometimes due to different harvest dates for the two experimental plots in the same village or due to last minute changes in the harvesting date owing to vagaries of weather or to suit the convenience of the cultivators, more than one visit had to be paid to the village for inspecting harvest operations.

6.5 With the organisation of central dridge experiments at the headquarters of the MSS additional visits to the sample villages subsequent to the harvest for observing dridge operations have been dispensed with. Table 0.3 below gives details of the number of visits paid on an average to a sample village at the pre-harvest and harvest stages for the purposes of spot check.

Table 0.3: Number of visits per village

A - KHARIF

| state                      | average number of visits per village |            |            |
|----------------------------|--------------------------------------|------------|------------|
|                            | pre-harvest                          | harvest    | total      |
| 1                          | 2                                    | 3          | 4          |
| 1. Andhra Pradesh          | 0.1                                  | 1.1        | 1.2        |
| 2. Assam                   | 0.1                                  | 0.9        | 1.0        |
| 3. Bihar                   | 0.6                                  | 1.1        | 1.7        |
| 4. Gujarat                 | 0.6                                  | 1.0        | 1.6        |
| 5. Haryana                 | 0.6                                  | 1.2        | 1.8        |
| 6. Jammu & Kashmir         | -                                    | 0.6        | 0.6        |
| 7. Kerala                  | 1.1                                  | 1.9        | 3.0        |
| 8. Madhya Pradesh          | 0.3                                  | 1.1        | 1.4        |
| 9. Madras                  | 0.8                                  | 1.4        | 2.2        |
| 10. Maharashtra            | 0.2                                  | 1.1        | 1.3        |
| 11. Mysore                 | 0.3                                  | 1.1        | 1.4        |
| 12. Orissa                 | 0.1                                  | 1.0        | 1.1        |
| 13. Punjab                 | 0.6                                  | 1.3        | 1.9        |
| 14. Rajasthan              | 0.1                                  | 1.1        | 1.2        |
| 15. Uttar Pradesh          | 0.2                                  | 1.1        | 1.3        |
| <u>all states combined</u> | <u>0.4</u>                           | <u>1.1</u> | <u>1.5</u> |



Table 0.3: (contd.) Number of visits per villageB - RABI

| state               | average number of visits per village |         |       |
|---------------------|--------------------------------------|---------|-------|
|                     | pre-harvest                          | harvest | total |
| (1)                 | (2)                                  | (3)     | (4)   |
| 1. Andhra Pradesh   | 0.0                                  | 1.1     | 1.1   |
| 2. Bihar            | 0.7                                  | 1.1     | 1.8   |
| 3. Gujarat          | 1.0                                  | 1.2     | 2.2   |
| 4. Haryana          | 0.8                                  | 1.3     | 2.1   |
| 5. Jammu & Kashmir  | 0.5                                  | 1.1     | 1.6   |
| 6. Madhya Pradesh   | 0.7                                  | 1.3     | 2.0   |
| 7. Maharashtra      | 0.2                                  | 1.2     | 1.4   |
| 8. Mysore           | 0.2                                  | 1.1     | 1.3   |
| 9. Punjab           | 0.4                                  | 1.6     | 2.0   |
| 10. Rajasthan       | 0.3                                  | 1.7     | 2.0   |
| 11. Uttar Pradesh   | 0.2                                  | 1.5     | 1.7   |
| All states combined | 0.5                                  | 1.3     | 1.8   |

6.6 The programme of work generally involved about two visits to a sample village. The average number of visits per village was highest in Kerala, but in this state the number of sample cuts for village were three as against two in each village in other states. For states other than Kerala the average number of visits per village was highest for Madras (2.2 during the kharif) and Gujarat (2.2 during rabi). The number of visits was the least for Jammu & Kashmir (0.6 during kharif) and Andhra Pradesh (1.1 during rabi).

6.7 In addition to the work of inspection at harvest-stage in a pre-assigned sample of villages, the supervisors were also required to record yield observations from square cut of size 5m x 5m, in a sub-sample of fields for comparing the yield obtained with those from the state cuts. The

results relating to the square cuts are presented in a separate report. Besides attending to the above mentioned items of work, the supervisors also observed the field work of crop estimation surveys outside the pre-assigned programme, and of other surveys and studies relating to agricultural statistics.

### 7. Formation of zones

7.1 The Officer-in-charge in each region formulated the field programme for his staff during 1967-68. Generally compact zone, each consisting of 6 to 8 sample villages, was assigned to each supervisor. Consideration of harvesting period, location of sample points and transport facilities were duly taken note of. Such a programme was found quite successful in all the states. No doubt, some flexibility existed in the manner of re-allocation of samples to the supervisors at the discretion of the Officer-in-charge in the region in order to meet the emergent situation arising out of sudden revision in harvest dates, communicated by the state field staff.

### 8. Execution of field programme

8.1 One of the handicaps in the execution of harvest-stage inspection programme related to the sudden changes communicated by the state field staff regarding dates of harvest. In practice, although the dates of harvest were fixed in consultation with the cultivators, often owing to vagaries of weather, some changes in the dates were made by the cultivators at the time of actual harvesting. To obviate any loss of inspection at harvest, all care was

taken to keep a close watch on this item. The primary workers or local officials and sometimes even the cultivators were requested to intimate such changes to the regional office telegraphically, whenever necessary. The magnitude of the problem may be had from the crop-wise percentages of experiments, for which the dates had to be changed, shown in table 0.4 below.

Table 0.4: Percentage of cases where harvest date was changed

| kharif |                     | rabi  |                     |
|--------|---------------------|-------|---------------------|
| crop   | percentage of cases | crop  | percentage of cases |
| 1      | 2                   | 3     | 4                   |
| paddy  | 40                  | wheat | 52                  |
| jowar  | 55                  | gram  | 43                  |
| maize  | 34                  | jowar | 50                  |
| bajra  | 52                  |       |                     |
| Total  | 45                  | Total | 48                  |

The originally fixed dates of harvest had to be change in 45 per cent cases in kharif and 48 per cent cases in rabi season.

8.2 There were sometimes also gaps of about a week or so in the harvest dates for the two experiments in the same village or between the harvest and threshing operations for the same experiment. These necessitated repeat visit to the sample villages and the intervening period was utilised for carrying out other items of work which were taken up after ensuring that they did not hamper the progress of harvest stage inspection programme.

### 9. Period of field work

9.1 The field work commenced in each state about a fortnight <sup>prior</sup> to the harvesting season of the crops covered in the states and came to a close as soon as the harvesting season was over. In most of the northern states, the harvesting period was spread over nearly 8 to 10 weeks during kharif season and about 8 weeks during the rabi season. In between the two seasons, usually there was a gap of one to two months. In Southern states, however, the harvesting period for kharif crops was spread over a period of 4 to 5 months.

### 10. Response

10.1 Out of a total of 2,690 experiments proposed for inspection as many as 2,456 (91 per cent) were inspected at harvest stage. State-wise details are given in statement 1 and 2 in the appendix. The number of experiments inspected for all crops together is given below separately for kharif and rabi seasons.

Table 0.5: Response

| season | number of experiments |           | percentage inspected |
|--------|-----------------------|-----------|----------------------|
|        | planned               | inspected |                      |
| 1      | 2                     | 3         | 4                    |
| kharif | 1740*                 | 1570      | 90                   |
| rabi   | 950                   | 886       | 93                   |
| total  | 2690                  | 2456      | 91                   |

[ \* Including 30 experiments on tabi paddy in Andhra Pradesh ]

A total of 234 experiments could not be inspected at

harvest by the central supervisory staff. The main reasons for the loss of experiments were (a) non-receipt of dates of harvesting (74 cases), (b) harvesting of the crop prior to the dates fixed for harvest (104 cases). The remaining few cases of losses were attributable to either pre-occupation of central supervisory staff somewhere else (13 cases) or due to failure of the conduct of the state experiments by the state primary workers on account of loss of experimental crop by theft etc. (43 cases) without the knowledge of the cultivator. State-wise and crop-wise break-up of loss of experiments according to the reasons is given in statement 3 in the appendix. The loss of experiment is of negligible order for paddy, wheat, gram and rabi jowar crops. However, in respect of millet crops, it exceeds slightly over 10 per cent. The loss was mainly due to sudden changes in the dates of harvest and the consequent inability of the central supervisory staff to re-schedule their programme to be present on the dates of harvest.

10.2 Of the experiments inspected, in about 5 per cent cases each during kharif and rabi seasons, the sample harvest was done in fields substituted in the place of initially selected random fields. A substitution would take place, for example, if the field which would have been selected according to the procedure laid down was found harvested at the time of selection. Since this would affect the result, special care was taken to ensure that the percentage for such cases was the bare minimum. Substitutions were permitted only in those cases where

the crops in a selected village/field was harvested before the actual conduct of the experiment, provided the instructions issued by the state allowed for substitution in such cases. Otherwise, such experiments, were considered as lost.

10.3 As mentioned earlier, visits to the sub-sample of fields selected for harvest stage inspection were not made subsequent to the harvest for inspection of driage experiments. The results of driage adopted for the report are based on the central driage experiments carried out by this Directorate under controlled conditions. For this purpose, the produce of square cuts referred to earlier was mailed to Faridabad (near Delhi) directly from the field

10.4 Statements 1 & 2 give details regarding the number of experiments planned state-wise and crop-wise, response and substitution and also the number of driage experiments conducted centrally. Details of the procedure followed for the central driage experiments along with driage ratio used for this report are given in appendix II. A detailed report of central driage experiments 1967-68 has been brought out separately.

#### 11. Estimation procedure

11.1 The selection of sample fields for harvest stage inspection programme was made from among the fields in selected villages growing the crop pertaining to the state list of sample villages adopted for regular crop estimation surveys, where the selection of fields was done irrespec-

tive of whether the crop was sown alone in the field (pure) or in mixture with other crop (mixed). The estimate of the average yield rate worked out by treating the sample plot yield as directly obtained from the cuts, irrespective of whether the cuts were from pure sown fields or from fields sown with crop in mixture, is termed the gross yield rate. If the plot yield from mixed fields are divided by the corresponding proportions of area under the crop in the fields obtained by eye estimation, and then added to the plot yields from all the plots sown with the pure crop, the resulting estimate of average yield is termed the net yield rate.

11.2 Data obtained from experiments inspected under the harvest stage inspection programme were tabulated and state-wise gross and net yield rates obtained, together with the sampling errors associated with the net yield rates. The yield rate of a crop at state level was obtained as a simple average in terms of the green harvested produce, and then multiplied with the corresponding drilage ratio. The drilage ratios based on the central drilage experiments mentioned earlier were utilised to obtain estimate of the yield rate in terms of dry grain.

11.3 The yield rates (in terms of dry grain) were pooled over states by using the respective crop areas as weight. The sampling errors of the estimates were obtained adopting the usual formula for two stage simple random sampling.

## 12. Results

12.1 Table 0.6 below gives the net yield rates based

on the results of inspection at harvest of crop cutting experiments carried out by the state field staff for each crop for the states covered by the inspection programme. The yield rates are in terms of dry grain. The sampling errors of the estimated yield rates are also shown against them.

Table 0.6: Net yield rates of dried grain in kgs./hect.

| crop           | number of experiments | average yield in kgs./hect. | percentage sampling error |
|----------------|-----------------------|-----------------------------|---------------------------|
| 1              | 2                     | 3                           | 4                         |
| rice           | 562                   | 974                         | 3.9                       |
| jowar (kharif) | 431                   | 552                         | 6.2                       |
| maize          | 278                   | 1033                        | 6.4                       |
| bajra          | 299                   | 329                         | 9.4                       |
| wheat          | 364                   | 920                         | 4.8                       |
| gram           | 334                   | 635                         | 5.9                       |
| jowar (rabi)   | 188                   | 567                         | 9.5                       |

The results suggest the following observations.

12.2 The yield rates at the all-India level (for the states covered) have been estimated with sampling error of 4 to 6 per cent for individual crops except for bajra and jowar (rabi) (about 9 per cent). The sampling errors of the estimates of average yield for bajra, and jowar (rabi) are somewhat on the high side due to wide variation in yield rates. Similar was the observation during earlier years also, suggesting the need for an enhancement in the scale of inspection. This is, however, not possible due to limited staff resources.

12.3 comparison of dried yield rates obtained during 1966-67 on the basis of spot check carried out on



almost the same scale of inspection, it has been observed that the yield rates for all crops except rabi jowar registered a higher yield rate. It was very much so for gram. The table 0.7 below gives the comparative results for the two years 1966-67 and 1967-68 based on inspected data for the common crops covered.

Table 0.7: Comparison of net yield rates of dried grain in kgs./hect.(1966-67 & 1967-68)

| crop          | number of expts. |         | average yield in kg./hect. |         | percentage difference |
|---------------|------------------|---------|----------------------------|---------|-----------------------|
|               | 1966-67          | 1967-68 | 1966-67                    | 1967-68 |                       |
| 1             | 2                | 3       | 4                          | 5       | 6                     |
| rice          | 547              | 562     | 779                        | 974     | -25.0                 |
| jowar(kharif) | 425              | 431     | 456                        | 552     | -21.1                 |
| maize         | 295              | 278     | 919                        | 1033    | -12.4                 |
| bajra         | 294              | 299     | 326                        | 329     | - 0.9                 |
| wheat         | 368              | 364     | 875                        | 920     | - 5.1                 |
| gram          | 330              | 334     | 389                        | 635     | -63.2                 |
| jowar (rabi)  | 174              | 188     | 577                        | 567     | + 1.7                 |

12.4 It may be of interest to make a comparison of yield rates for individual crops based on sample check with those based on overall data on the all-India level. Table 0.8 provides such a comparison.

Table 0.8 Comparison of net yield rates state series and harvest stage inspection 1967-68

| crop           | average yield in kgs./hect. |            | percentage difference |
|----------------|-----------------------------|------------|-----------------------|
|                | state                       | inspection |                       |
| 1              | 2                           | 3          | 4                     |
| rice           | 1020                        | 974        | 4.5                   |
| jowar (kharif) | 573                         | 552        | 3.7                   |
| maize          | 1105                        | 1033       | 6.5                   |
| bajra          | 396                         | 329        | 16.9                  |
| wheat          | 1113                        | 920        | 17.3                  |
| gram           | 745                         | 635        | 14.8                  |
| jowar (rabi)   | 490                         | 567        | -15.7                 |

It may be clarified that the harvest stage inspection sample is a part of the entire sample adopted for regular crop estimation surveys and, therefore, the yield data from the fields selected for spot check form part of the data for state tabulation also for formulating the estimates for state series. It is observed that the yield estimates based on harvest-stage inspection programme at all-India level is in close agreement with the yield rates of the state series for rice, jowar (kharif) and maize. Considering the extent of sampling error of the estimates based on harvest stage inspection, the margin of difference in the case of bajra and jowar (rabi) should be considered close enough. It is only in respect of wheat and gram that one notices a marked difference in the two sets of estimates. One possible reason is the adoption of high yield varieties. Since this programme is concentrated and confined to limited areas, there is a likelihood of its effect not being reflected in the programme of inspection at harvest in view of the (i) the limited scale of inspection, and (ii) rather wide stratification adopted for selection of sample (in contrast to deep stratification and intensive scale of experiments for the overall sample). This would merit a closer examination when the results of analysis of ancillary data become available for the overall sample.

### 13. Conclusion

13.1 The programme of pre-assigned sample has demonstrated the feasibility of estimating the yield rate at the all India level with a reasonable degree of precision by a

central team of supervisors. The percentage sampling errors of yield rates based on data from the sample check was between 4 to 6 per cent in case of all crops except bajra and jowar (rabi) (about 9 per cent). The estimates based on the spot inspection did not compare unfavourably with those based on the over-all state data.

Statement 1: Number of experiments planned, inspected, substituted and central drilage experiments - Kharif 1967-68.

| State           | paddy                 |           |                         |             |              |                                  | jowar                 |           |         |                         |                   |         | maize                            |                       |         |                         |              |     |                                  |
|-----------------|-----------------------|-----------|-------------------------|-------------|--------------|----------------------------------|-----------------------|-----------|---------|-------------------------|-------------------|---------|----------------------------------|-----------------------|---------|-------------------------|--------------|-----|----------------------------------|
|                 | number of experiments |           | number of substitutions |             |              | number of central drilage expts. | number of experiments |           |         | number of substitutions |                   |         | number of central drilage expts. | number of experiments |         | number of substitutions |              |     | number of central drilage expts. |
|                 | planned               | inspected | village                 | experiments | total expts. |                                  | planned               | inspected | village | experiments             | total experiments | planned |                                  | inspected             | village | experiments             | total expts. |     |                                  |
| 1               | 2                     | 3         | 4                       | 5           | 6            | 7                                | 8                     | 9         | 10      | 11                      | 12                | 13      | 14                               | 15                    | 16      | 17                      | 18           | 19  |                                  |
| Andhra Pradesh  | 30                    | 80        | -                       | 2           | 2            | 33                               | 60                    | 54        | -       | -                       | -                 | 20      | 30                               | 26                    | -       | 1                       | 1            | -   |                                  |
| Assam           | 60                    | 56        | -                       | 7           | 7            | -                                | -                     | -         | -       | -                       | -                 | -       | -                                | -                     | -       | -                       | -            | -   |                                  |
| Bihar           | 100                   | 99        | 1                       | 9           | 11           | 58                               | -                     | -         | -       | -                       | -                 | -       | 60                               | 60                    | 1       | 12                      | 14           | 27  |                                  |
| Gujarat         | -                     | -         | -                       | -           | -            | -                                | 30                    | 27        | -       | -                       | -                 | 10      | 20                               | 14                    | -       | -                       | -            | 12  |                                  |
| Haryana         | 20                    | 20        | -                       | 1           | 1            | 20                               | 20                    | 16        | -       | 1                       | 1                 | 4       | -                                | -                     | -       | -                       | -            | -   |                                  |
| Jammu & Kashmir | -                     | -         | -                       | -           | -            | -                                | -                     | -         | -       | -                       | -                 | -       | 30                               | 14                    | -       | -                       | -            | 9   |                                  |
| Kerala          | 60                    | 46        | -                       | 3           | 3            | -                                | -                     | -         | -       | -                       | -                 | -       | -                                | -                     | -       | -                       | -            | -   |                                  |
| Madhya Pradesh  | 30                    | 26        | -                       | -           | -            | 23                               | 40                    | 39        | -       | -                       | -                 | 33      | 30                               | 26                    | -       | -                       | -            | 22  |                                  |
| Madras          | 50                    | 46        | -                       | -           | -            | 23                               | 60                    | 52        | -       | 2                       | 2                 | 12      | -                                | -                     | -       | -                       | -            | -   |                                  |
| Maharashtra     | 20                    | 19        | -                       | -           | -            | 16                               | 80                    | 74        | -       | 2                       | 2                 | 39      | -                                | -                     | -       | -                       | -            | -   |                                  |
| Mysore          | 20                    | 17        | -                       | 3           | 3            | 11                               | 80                    | 65        | -       | 12                      | 12                | 31      | -                                | -                     | -       | -                       | -            | -   |                                  |
| Orissa          | 70                    | 66        | 1                       | 5           | 7            | -                                | -                     | -         | -       | -                       | -                 | -       | -                                | -                     | -       | -                       | -            | -   |                                  |
| Punjab          | 20                    | 19        | -                       | -           | -            | 19                               | -                     | -         | -       | -                       | -                 | -       | 50                               | 46                    | -       | -                       | -            | 42  |                                  |
| Rajasthan       | -                     | -         | -                       | -           | -            | -                                | 50                    | 49        | -       | -                       | -                 | 26      | 50                               | 44                    | -       | -                       | -            | 36  |                                  |
| Uttar Pradesh   | 70                    | 68        | -                       | 4           | 4            | 57                               | 60                    | 55        | -       | 5                       | 5                 | 17      | 60                               | 48                    | -       | 5                       | 5            | 31  |                                  |
| States covered  | 600                   | 562       | 2                       | 34          | 38           | 260                              | 480                   | 431       | -       | 22                      | 22                | 192     | 330                              | 278                   | 1       | 18                      | 20           | 179 |                                  |

| state           | bajra                    |                |                            |                  |                           | no. of cen-<br>tral draige<br>expts. | kharif - crops           |                |                            |                  |                 | no. of cen-<br>tral draige<br>expts. |
|-----------------|--------------------------|----------------|----------------------------|------------------|---------------------------|--------------------------------------|--------------------------|----------------|----------------------------|------------------|-----------------|--------------------------------------|
|                 | number of<br>experiments |                | number of<br>substitutions |                  |                           |                                      | number of<br>experiments |                | number of<br>substitutions |                  |                 |                                      |
|                 | planned                  | ins-<br>pected | village                    | experi-<br>ments | total<br>expe-<br>riments |                                      | planned                  | ins-<br>pected | village                    | experi-<br>ments | total<br>expts. |                                      |
| 1               | 20                       | 21             | 22                         | 23               | 24                        | 25                                   | 26                       | 27             | 28                         | 29               | 30              | 31                                   |
| Andhra Pradesh  | 30                       | 28             | -                          | -                | -                         | 10                                   | 200                      | 188            | -                          | 3                | 3               | 63                                   |
| Assam           | -                        | -              | -                          | -                | -                         | -                                    | 60                       | 56             | -                          | 7                | 7               | -                                    |
| Bihar           | -                        | -              | -                          | -                | -                         | -                                    | 160                      | 159            | 2                          | 21               | 25              | 85                                   |
| Gujarat         | 50                       | 45             | -                          | -                | -                         | 35                                   | 100                      | 86             | -                          | -                | -               | 57                                   |
| Haryana         | 30                       | 29             | -                          | 2                | 2                         | 19                                   | 70                       | 65             | -                          | 4                | 4               | 43                                   |
| Jammu & Kashmir | -                        | -              | -                          | -                | -                         | -                                    | 30                       | 14             | -                          | -                | -               | 9                                    |
| Kerala          | -                        | -              | -                          | -                | -                         | -                                    | 60                       | 146            | -                          | 3                | 3               | -                                    |
| Madhya Pradesh  | 20                       | 16             | -                          | -                | -                         | 13                                   | 120                      | 107            | -                          | -                | -               | 91                                   |
| Madras          | 50                       | 48             | -                          | -                | -                         | 11                                   | 160                      | 146            | -                          | 2                | 2               | 46                                   |
| Maharashtra     | 40                       | 31             | -                          | -                | -                         | 14                                   | 140                      | 124            | -                          | 2                | 2               | 69                                   |
| Mysore          | 20                       | 18             | -                          | 4                | 4                         | 13                                   | 120                      | 100            | -                          | 19               | 19              | 55                                   |
| Orissa          | -                        | -              | -                          | -                | -                         | -                                    | 70                       | 66             | 1                          | 5                | 7               | -                                    |
| Punjab          | -                        | -              | -                          | -                | -                         | -                                    | 70                       | 65             | -                          | -                | -               | 61                                   |
| Rajasthan       | 50                       | 46             | -                          | -                | -                         | 25                                   | 150                      | 139            | -                          | -                | -               | 87                                   |
| Uttar Pradesh   | 40                       | 38             | -                          | 4                | 4                         | 14                                   | 230                      | 209            | -                          | 18               | 18              | 119                                  |
| States covered  | 330                      | 299            | -                          | 10               | 10                        | 154                                  | 1740                     | 1570           | 3                          | 84               | 90              | 785                                  |

Statement 2: Number of experiments planned, inspected, substituted and central drriage experiments - rabi, 1967 - 68.

| state           | wheat                 |           |                         |              |              |                               | gram                  |           |                         |              |              |                               |
|-----------------|-----------------------|-----------|-------------------------|--------------|--------------|-------------------------------|-----------------------|-----------|-------------------------|--------------|--------------|-------------------------------|
|                 | number of experiments |           | number of substitutions |              |              | no. of central drriage expts. | number of experiments |           | number of substitutions |              |              | no. of central drriage expts. |
|                 | planned               | inspected | vi-llage                | experi-ments | total expts. |                               | planned               | inspected | vi-llage                | experi-ments | total expts. |                               |
| 1               | 2                     | 3         | 4                       | 5            | 6            | 7                             | 8                     | 9         | 10                      | 11           | 12           | 13                            |
| Andhra Pradesh  | ..                    | ..        | ..                      | ..           | ..           | ..                            | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Bihar           | 40                    | 40        | 1                       | 11           | 13           | 26                            | 50                    | 50        | 1                       | 6            | 8            | 36                            |
| Gujarat         | 40                    | 38        | ..                      | ..           | ..           | 27                            | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Haryana         | 20                    | 20        | ..                      | ..           | ..           | 15                            | 50                    | 48        | ..                      | 4            | 4            | 29                            |
| Jammu & Kashmir | 20                    | 16        | ..                      | ..           | ..           | 9                             | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Madhya Pradesh  | 50                    | 47        | ..                      | ..           | ..           | 25                            | 60                    | 55        | ..                      | ..           | ..           | 34                            |
| Maharashtra     | 50                    | 47        | ..                      | ..           | ..           | 21                            | 20                    | 19        | ..                      | ..           | ..           | 12                            |
| Mysore          | 30                    | 13        | ..                      | 5            | 5            | 5                             | ..                    | ..        | ..                      | ..           | ..           | ..                            |
| Punjab          | 40                    | 37        | ..                      | ..           | ..           | 29                            | 30                    | 26        | ..                      | ..           | ..           | 21                            |
| Rajasthan       | 50                    | 49        | ..                      | ..           | ..           | 36                            | 60                    | 60        | ..                      | ..           | ..           | 33                            |
| Uttar Pradesh   | 60                    | 57        | ..                      | 2            | 2            | 48                            | 80                    | 76        | ..                      | 8            | 8            | 45                            |
| States covered  | 400                   | 364       | 1                       | 18           | 20           | 241                           | 350                   | 334       | 1                       | 18           | 20           | 210                           |

## Statement 2: (contd.)

| state           | kharif                |                |                         |                  |                 |                                    | rabi - crops          |                |                         |                  |                 |                                    |
|-----------------|-----------------------|----------------|-------------------------|------------------|-----------------|------------------------------------|-----------------------|----------------|-------------------------|------------------|-----------------|------------------------------------|
|                 | number of experiments |                | number of substitutions |                  |                 | no. of central<br>driage<br>expts. | number of experiments |                | number of substitutions |                  |                 | no. of central<br>driage<br>expts. |
|                 | pla-<br>nned          | ins-<br>pected | vi-<br>llage            | experi-<br>ments | total<br>expts. |                                    | pla-<br>nned          | ins-<br>pected | vi-<br>llage            | experi-<br>ments | total<br>expts. |                                    |
| 1               | 14                    | 15             | 16                      | 17               | 18              | 19                                 | 20                    | 21             | 22                      | 23               | 24              | 25                                 |
| Andhra Pradesh  | 50                    | 50             | ..                      | ..               | ..              | 40                                 | 50                    | 50             | ..                      | ..               | ..              | 40                                 |
| Bihar           | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 90                    | 90             | 2                       | 17               | 21              | 62                                 |
| Gujarat         | 20                    | 18             | ..                      | ..               | ..              | 10                                 | 60                    | 56             | ..                      | ..               | ..              | 37                                 |
| Haryana         | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 70                    | 68             | ..                      | 4                | 4               | 44                                 |
| Jammu & Kashmir | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 20                    | 16             | ..                      | ..               | ..              | 09                                 |
| Madhya Pradesh  | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 110                   | 102            | ..                      | ..               | ..              | 59                                 |
| Maharashtra     | 70                    | 67             | ..                      | ..               | ..              | 55                                 | 140                   | 133            | ..                      | ..               | ..              | 88                                 |
| Mysore          | 60                    | 53             | ..                      | 5                | 5               | 41                                 | 90                    | 66             | ..                      | 10               | 10              | 46                                 |
| Punjab          | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 70                    | 63             | ..                      | ..               | ..              | 50                                 |
| Rajasthan       | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 110                   | 109            | ..                      | ..               | ..              | 69                                 |
| Uttar Pradesh   | ..                    | ..             | ..                      | ..               | ..              | ..                                 | 140                   | 133            | ..                      | 10               | 10              | 93                                 |
| States covered  | 200                   | 188            | ..                      | 5                | 5               | 146                                | 950                   | 886            | 2                       | 41               | 45              | 597                                |

Statement 3: Reasons for loss of experiments 1967-68

| crop                  | state                 | number of experiments |            | reasons for loss of experiments |           |           |          | total expts. lost |
|-----------------------|-----------------------|-----------------------|------------|---------------------------------|-----------|-----------|----------|-------------------|
|                       |                       | planned               | received   | A                               | B         | C         | D        |                   |
| 1                     | 2                     | 3                     | 4          | 5                               | 6         | 7         | 8        | 9                 |
| <u>Khariif</u>        |                       |                       |            |                                 |           |           |          |                   |
| Paddy                 | Andhra Pradesh        | 80                    | 80         | -                               | -         | -         | -        | -                 |
|                       | Assam                 | 60                    | 56         | 1                               | 3         | -         | -        | 4                 |
|                       | Bihar                 | 100                   | 99         | -                               | -         | 1         | -        | 1                 |
|                       | Haryana               | 20                    | 20         | -                               | -         | -         | -        | -                 |
|                       | Kerala                | 60                    | 46         | 8                               | 3         | -         | 3        | 14                |
|                       | Madhya Pradesh        | 30                    | 26         | 3                               | -         | -         | 1        | 4                 |
|                       | Madras                | 50                    | 46         | 2                               | 2         | -         | -        | 4                 |
|                       | Maharashtra           | 20                    | 19         | -                               | 1         | -         | -        | 1                 |
|                       | Mysore                | 20                    | 17         | 1                               | -         | 2         | -        | 3                 |
|                       | Orissa                | 70                    | 66         | 2                               | 2         | -         | -        | 4                 |
|                       | Punjab                | 20                    | 19         | -                               | 1         | -         | -        | 1                 |
|                       | Uttar Pradesh         | 70                    | 68         | -                               | 2         | -         | -        | 2                 |
| <u>States covered</u> |                       | <u>600</u>            | <u>562</u> | <u>17</u>                       | <u>14</u> | <u>3</u>  | <u>4</u> | <u>38</u>         |
| Jowar                 | Andhra Pradesh        | 60                    | 54         | 2                               | 2         | -         | 2        | 6                 |
|                       | Gujarat               | 30                    | 27         | 3                               | -         | -         | -        | 3                 |
|                       | Haryana               | 20                    | 16         | -                               | 2         | -         | 2        | 4                 |
|                       | Madhya Pradesh        | 40                    | 39         | -                               | 1         | -         | -        | 1                 |
|                       | Madras                | 60                    | 52         | 5                               | 3         | -         | -        | 8                 |
|                       | Maharashtra           | 80                    | 74         | -                               | 6         | -         | -        | 6                 |
|                       | Mysore                | 80                    | 65         | -                               | 4         | 4         | 7        | 15                |
|                       | Rajasthan             | 50                    | 49         | -                               | 1         | -         | -        | 1                 |
|                       | Uttar Pradesh         | 60                    | 55         | -                               | 5         | -         | -        | 5                 |
|                       | <u>States covered</u> |                       | <u>480</u> | <u>431</u>                      | <u>10</u> | <u>24</u> | <u>4</u> | <u>11</u>         |
| Maize                 | Andhra Pradesh        | 30                    | 26         | -                               | 4         | -         | -        | 4                 |
|                       | Bihar                 | 60                    | 60         | -                               | -         | -         | -        | -                 |
|                       | Gujarat               | 20                    | 14         | 4                               | 2         | -         | -        | 6                 |
|                       | Jammu & Kashmir       | 30                    | 14         | -                               | 6         | -         | 10       | 16                |
|                       | Madhya Pradesh        | 30                    | 26         | -                               | 3         | -         | 1        | 4                 |
|                       | Punjab                | 50                    | 46         | -                               | 4         | -         | -        | 4                 |
|                       | Rajasthan             | 50                    | 44         | 3                               | 3         | -         | -        | 6                 |
|                       | Uttar Pradesh         | 60                    | 48         | 8                               | 2         | -         | 2        | 12                |
|                       | <u>States covered</u> |                       | <u>330</u> | <u>278</u>                      | <u>15</u> | <u>24</u> | <u>-</u> | <u>13</u>         |
| Bajra                 | Andhra Pradesh        | 30                    | 28         | 2                               | -         | -         | -        | 2                 |
|                       | Gujarat               | 50                    | 45         | 5                               | -         | -         | -        | 5                 |
|                       | Haryana               | 30                    | 29         | -                               | 1         | -         | -        | 1                 |
|                       | Madhya Pradesh        | 20                    | 16         | 4                               | -         | -         | -        | 4                 |
|                       | Madras                | 50                    | 48         | 1                               | 1         | -         | -        | 2                 |
|                       | Maharashtra           | 40                    | 31         | 1                               | 8         | -         | -        | 9                 |
|                       | Mysore                | 20                    | 18         | -                               | -         | -         | 2        | 2                 |
|                       | Punjab                | -                     | -          | -                               | -         | -         | -        | -                 |
|                       | Rajasthan             | 50                    | 46         | 2                               | 2         | -         | -        | 4                 |
|                       | Uttar Pradesh         | 40                    | 38         | -                               | 2         | -         | -        | 2                 |
| <u>States covered</u> |                       | <u>330</u>            | <u>297</u> | <u>15</u>                       | <u>14</u> | <u>-</u>  | <u>2</u> | <u>31</u>         |



## Statement 3: (contd.)

| crop           | state           | number of experiments |          | reasons for loss of experiments |    |   |   | total expts. lost |
|----------------|-----------------|-----------------------|----------|---------------------------------|----|---|---|-------------------|
|                |                 | planned               | received | A                               | B  | C | D |                   |
| 1              | 2               | 3                     | 4        | 5                               | 6  | 7 | 8 | 9                 |
| <u>Rabi</u>    |                 |                       |          |                                 |    |   |   |                   |
| Wheat          | Bihar           | 40                    | 40       | -                               | -  | - | - | -                 |
|                | Gujarat         | 40                    | 38       | -                               | 2  | - | - | 2                 |
|                | Haryana         | 20                    | 20       | -                               | -  | - | - | -                 |
|                | Jammu & Kashmir | 20                    | 16       | -                               | 4  | - | - | 4                 |
|                | Madhya Pradesh  | 50                    | 47       | -                               | -  | - | 3 | 3                 |
|                | Maharashtra     | 50                    | 47       | 1                               | 1  | 1 | - | 3                 |
|                | Mysore          | 30                    | 13       | 6                               | 1  | 5 | 5 | 17                |
|                | Punjab          | 40                    | 37       | 2                               | 1  | - | - | 3                 |
|                | Rajasthan       | 50                    | 49       | -                               | 1  | - | - | 1                 |
| Uttar Pradesh  | 60              | 57                    | -        | 3                               | -  | - | 3 |                   |
| States covered |                 | 400                   | 364      | 9                               | 13 | 6 | 8 | 36                |
| Gram           | Bihar           | 50                    | 50       | -                               | -  | - | - | -                 |
|                | Haryana         | 50                    | 48       | -                               | 2  | - | - | 2                 |
|                | Madhya Pradesh  | 60                    | 55       | -                               | 3  | - | 2 | 5                 |
|                | Maharashtra     | 20                    | 19       | 1                               | -  | - | - | 1                 |
|                | Punjab          | 30                    | 26       | -                               | 4  | - | - | 4                 |
|                | Rajasthan       | 60                    | 60       | -                               | -  | - | - | -                 |
|                | Uttar Pradesh   | 30                    | 26       | -                               | 2  | - | 2 | 4                 |
| States covered |                 | 350                   | 334      | 1                               | 11 | - | 4 | 16                |
| Jowar          | Andhra Pradesh  | 50                    | 50       | -                               | -  | - | - | -                 |
|                | Gujarat         | 20                    | 18       | 1                               | 1  | - | - | 2                 |
|                | Maharashtra     | 70                    | 67       | -                               | 3  | - | - | 3                 |
|                | Mysore          | 60                    | 53       | 6                               | -  | - | 1 | 7                 |
| States covered |                 | 200                   | 188      | 7                               | 4  | - | 1 | 12                |

A: Harvest date not received from primary worker or intimation received late.

B: Harvested earlier than the date fixed.

C: Pre-occupation of central supervisory staff elsewhere for inspection work.

D: Other reasons, such as failure of crop, loss of experimental crop by theft without the knowledge of the cultivator, etc.

Appendix - I

Statement giving shape and size of plots adopted for crop estimation surveys in different States and agencies for field work for the States and crops covered by the harvest-stage inspection programme.

| state           | agency for field work       | crops covered  | shape of plot | size of the plot              |
|-----------------|-----------------------------|--|---------------|-------------------------------|
| 1               | 2                           | 3  | 4             | 5                             |
| Andhra Pradesh  | statistics<br>revenue       | paddy, kharif, jowar, rabi jowar & bajra<br>maize      | rect.         | 1/101.2th acre<br>(10 m x 4m) |
| Assam           | special (statistical staff) | paddy  | square        | 1/160th acre<br>(16½' x 16½') |
| Bihar           | revenue<br>statistics       | paddy, wheat and gram,<br>maize                        | rect.         | 1/80th acre<br>(33' x 16½')   |
| Gujarat         | revenue and development     | kharif jowar, maize, bajra, wheat and rabi jowar       | square        | 1/40.5th acre<br>(10m x 10m)  |
| Haryana         | revenue and agriculture     | paddy, kharif jowar, bajra, wheat, and gram            | rect.         | 1/80.9th acre<br>(10m x 5m)   |
| Jammu & Kashmir | revenue                     | maize and wheat  | rect.         | 1/30th acre<br>(33' x 16½')   |
| Kerala          | special (statistical staff) | paddy  | square        | 1/161.9th acre<br>(5m x 5m)   |
| Madhya Pradesh  | revenue                     | paddy, kharif jowar, bajra, maize, wheat and gram      | rect.         | 1/80.9th acre<br>(10m x 5m)   |
| Madras          | agriculture                 | paddy, kharif jowar and bajra                          | rect.         | 1/80.9th acre<br>(10m x 5m)   |
| Maharashtra     | revenue and development     | paddy, kharif jowar, bajra, wheat, gram and rabi jowar | square        | 1/40.5th acre<br>(10m x 10m)  |

## Appendix I: (contd.)

| state         | agency for field work                        | crops covered                                     | shape of plot          | size of the plot                       |
|---------------|--|---|------------------------|--|
| 1             | 2  | 3   | 4                      | 5                                      |
| Mysore        | revenue                                      | paddy, kharif jowar, bajra, wheat and rabi jowar  | rect.                  | 1/80.9th acre (10m x 5m)               |
| Orissa        | special staff amin(Department of Statistics) | paddy   | circle                 | 1/866.3th acre (radius of 4')          |
| Punjab        | revenue and agriculture                      | paddy, maize, wheat and gram                      | rect.                  | 1/80.9th acre (10m x 5m)               |
| Rajasthan     | revenue                                      | kharif jowar, maize, bajra, wheat and gram        | rect.                  | 1/80th acre (33' x 16 $\frac{1}{2}$ ') |
| Uttar Pradesh | revenue                                      | paddy, kharif jowar, maize, bajra, wheat and gram | equi-late-ral tri-ngle | 1/93.4th acre) (10 metres side)        |

APPENDIX IICentral Driage Experiments, 1967-68

1. The Directorate of NSS initiated the programme of central driage experiments in 1960-61 on a small scale at the Headquarters (New Delhi). This established the feasibility of carrying out central driage operations at a suitable central place. The central driage experiments were taken up on regular basis from 1961-62 so that driage ratios calculated from them could be readily available for obtaining yield rates in terms of dried grains from the data of experiments inspected under the harvest-stage inspection programme for which weights of the green produce had been reported by the supervisors.
2. Scale of work:- During 1967-68 the supervisors were required to conduct crop cutting experiments in plots of size 5m x 5m square in some of the fields selected for harvest stage inspection. They were asked to mail to the headquarters a sample of 2 kilograms of produce for jowar, bajra and maize and 1 kilogram of paddy, wheat and gram obtained from each of the square cuts for the purpose of central driage experiments, at Faridabad. The produce was received for a total of 804 experiments in kharif season and 633 experiments in rabi season. Of these 36 in kharif (out of 804) and 19 in rabi (out of 633) were rejected on account of damage in transit or otherwise not conforming to requirements.
3. Procedure for despatch of bags:- The produce for driage experiments at Faridabad had to be properly sealed

in cloth bag of white drill and mailed as a registered parcel. The contents of the produce consisted of cobs for jowar, maize and bajra and grain for paddy, wheat and gram.

4. Driage procedure followed at headquarters:- The procedure followed for the conduct of these experiments at the headquarters is indicated below

- (i) Examination of the contents and taking weight to the nearest 5 grams as soon as the bag was received. The weight of the empty bag was also noted.
- (ii) The produce was thereafter put in the bag and the closed bag was exposed to the sun daily (excluding rainy days and holidays). The bag was exposed till a constant weight was attained in three consecutive weighments. Weighments were taken on alternate days.
- (iii) When constancy had been attained the bag was opened and the weight of dried produce noted.
- (iv) In the case of cobs the produce was threshed and cleaned. The cleaned grain was again exposed to the sun till its weight became steady.

5. Arrangements for storage and driage:- For the purpose of storing the bags, a steel Godrej rack covered with a frame of wire netting was kept in a hall. This protected the produce from any possible damage from rats etc. The bags were exposed to the sun daily by placing them on a tarpaulin and covered with hen-cooplike frame of wire netting. This arrangement kept the produce free from damage by birds etc. and at the same time obviated the necessity for a whole-time worker to keep watch on them. The weights were taken with the help of a counter-balance, which considerably quickened the weighing operations.

6. Results:- Table A.II enclosed gives state-wise and crop-wise driage ratios used for this report together with the source of information.

**DIRECTORATE OF NATIONAL SAMPLE SURVEY**  
(Agricultural Statistics Division)

**List of Publications**

**A. Crop Estimation Surveys (State Series)**

**A.1. Annual results**

- Consolidated results of crop estimation surveys on principal food crops, 1955-56.
- Consolidated results of crop estimation surveys on principal food crops, 1956-57.
- Consolidated results of crop estimation surveys on principal food crops, 1957-58.
- Consolidated results of crop estimation surveys on principal non-food crops, 1957-58.
- Consolidated results of crop estimation surveys on principal food crops, 1958-59.
- Consolidated results of crop estimation surveys on principal non-food crops, 1958-59.
- Consolidated results of crop estimation surveys on principal food crops, 1959-60.
- Consolidated results of crop estimation surveys on principal non-food crops, 1959-60.
- Consolidated results of crop estimation surveys on principal food crops, 1960-61.
- Consolidated results of crop estimation surveys on principal non-food crops, 1960-61.
- Consolidated results of crop estimation surveys on principal food crops, 1961-62.
- Consolidated results of crop estimation surveys on principal non-food crops, 1961-62.
- Consolidated results of crop estimation surveys on principal food crops, 1949-50 to 1960-61.
- Consolidated results of crop estimation surveys on principal food crops, 1962-63.
- Consolidated results of crop estimation surveys on principal non food crops, 1962-63.
- Consolidated results of crop estimation surveys on principal crops, 1963-64.
- Consolidated results of crop estimation surveys on principal crops, 1964-65.
- Consolidated results of crop estimation surveys on principal crops, 1965-66.
- Consolidated results of crop estimation surveys on principal crops, 1966-67.
- Consolidated results of crop estimation surveys on principal crops, 1967-68.

**A.2. Supervision of crop cutting experiments**

- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Kharif, 1960-61.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, Rabi, 1960-61.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1961-62.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1962-63.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1963-64.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1964-65.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1965-66.
- Report on the special Supervisory check on crop estimation surveys on cotton, 1964-65.
- Report on the special supervisory check on crop estimation surveys on cotton, 1965-66.
- Report on the inspection of crop cutting experiments at harvest stage on a randomised basis, 1966-67.
- Report on special supervisory check on crop estimation surveys on cotton, 1966-67.
- Report on special supervisory check on crop estimation surveys on cotton, 1967-68.
- Report on inspection of crop cutting experiments at harvest stage on a randomised basis, 1967-68.

**A.3. Special studies**

- Report on Central driage experiments, 1960-61.
- Report on the joint crop cutting studies at Bundi (Rajasthan), Kharif, 1960-61.
- Report on the joint crop cutting studies at Barh (Bihar), Rabi, 1960-61.
- Report on Central driage experiments, 1961-62.
- Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1960-61 and 1961-62.
- Report on Central driage experiments, 1962-63.
- Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1962-63.
- Report on Central driage experiments, 1963-64.
- Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1963-64.
- Report on Central driage experiments at NSS Block offices, 1962-63.
- Report on Type-2 study on maize, Bihar, 1963-64.
- Report on Type-2 study on paddy, Andhra Pradesh, 1963-64.
- Report on Type-2 study on wheat, Uttar Pradesh, 1964-65.
- Report on circular cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1964-65.
- Report on Central driage experiments, 1964-65.
- Report on Central driage experiments, 1965-66.
- Report on square cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1965-66.
- Report on Type-2 study on jowar (Kharif), Mysore, 1965-66.
- Report on Central driage experiments, 1966-67.
- Report on square cuts conducted by the NSS supervisory staff in the Agricultural Statistics Division, 1966-67.
- Report on square cuts conducted by the NSS Supervisory staff in the Agricultural Statistics Division, 1967-68.
- Report on Central driage experiments, 1967-68.

Appendix - II

Statement - A 1c Crop-wise drriage ratios used along with  
the source, harvest-stage inspection, 1967-68

| state           | kharif   |        |         |        | rabi   |        |        |
|-----------------|----------|--------|---------|--------|--------|--------|--------|
|                 | paddy    | jowar  | maize   | bajra  | wheat  | gram   | jowar  |
| 1               | 2        | 3      | 4       | 5      | 6      | 7      | 8      |
| Andhra Pradesh  | 0.8666   | 0.5455 | 0.5070@ | 0.5071 | -      | -      | 0.6217 |
| Assam           | 0.8270*  | -      | -       | -      | -      | -      | -      |
| Bihar           | 0.8430   | -      | 0.5036  | -      | 0.9130 | 0.9170 | -      |
| Gujarat         | -        | 0.5220 | 0.4973  | 0.5599 | 0.9484 | -      | 0.5455 |
| Haryana         | 0.8496   | 0.5730 | -       | 0.5165 | 0.9370 | 0.9348 | -      |
| Jammu & Kashmir | -        | -      | 0.4973  | -      | 0.8801 | -      | -      |
| Kerala          | 0.8420*  | -      | -       | -      | -      | -      | -      |
| Madhya Pradesh  | 0.8433   | 0.5573 | 0.4336  | 0.4860 | 0.9340 | 0.9353 | -      |
| Madras          | 0.8841   | 0.5833 | -       | 0.5772 | -      | -      | -      |
| Maharashtra     | 0.8569   | 0.5840 | -       | 0.5504 | 0.9134 | 0.9464 | 0.6083 |
| Mysore          | 0.8204   | 0.5499 | -       | 0.5143 | 0.8854 | -      | 0.6098 |
| Orissa          | 0.8887** | -      | -       | -      | -      | -      | -      |
| Punjab          | 0.8189   | -      | 0.3790  | -      | 0.9497 | 0.9308 | -      |
| Rajasthan       | -        | 0.4966 | 0.5260  | 0.5150 | 0.9524 | 0.9510 | -      |
| Uttar Pradesh   | 0.8503   | 0.5037 | 0.4245  | 0.4695 | 0.9503 | 0.9368 | -      |

Note: Source - central drriage experiments, 1967-68.

\* Central drriage experiments, 1964-65.

\*\* Central drriage experiments, 1963-64.

@ State drriage ratio, 1967-68.

**DIRECTORATE OF NATIONAL SAMPLE SURVEY**  
(Agricultural Statistics Division)

**List of Publications**

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- F.2. . . . . Report on the pilot survey of inland fisheries, Coasa, 1962-63.

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- M.1. . . . . Report on the surveys for assessment of additional yield from land reclaimed by Central Tractor Organisation, 1951-52 to 1954-55.