

REPORT
OF THE WORKING GROUP
ON
CLASSIFICATION OF BLOCKS
FOR INTENSIFIED APPROACH
TO SELECTED PROGRAMMES



MINISTRY OF
DEVELOPMENT AND COOPERATION
GOVERNMENT OF INDIA
NEW DELHI

1. INTRODUCTION

1.1. The question of intensive development in the field of agricultural production on a selected basis was discussed at the Annual Conference on Community Development and Panchayati Raj held at New Delhi in 1963, which recommended that with a view to concentrating efforts the Blocks should be classified according to their potential for quick agricultural development. The Ministry of Community Development and Cooperation consequently set up this Working Group *viz* their O.M. No. 1(1)(3)/63-Agr., dated November 2, 1963, (Annexure I), with the following composition and Terms of Reference :

Composition :

- (1) Shri B. Mukerji, Managing Director, State Bank of India, Bombay Chairman.
- (2) Dr. Douglas Ensminger, Representative in India, The Ford Foundation Member.
- (3) Dr. J. S. Patel, Agricultural Commissioner, I.C.A.R. (Ministry of Food and Agriculture) .. Member.
- (4) Shri D. P. Singh, Joint Secretary, Planning Commission Member.
- (5) Shri M. M. K. Wali, Deputy Secretary, Ministry of Community Development and Cooperation .. Member-Secretary.

Terms of Reference :

- (i) To suggest the criteria to be adopted for classification of Blocks for purposes of implementing selected programmes in the field of agricultural production;
- (ii) To recommend in broad terms the programmes for each category of Blocks on which resources should be concentrated in that field;
- (iii) To consider the need for other intensive programmes to diversify the rural economy and the basis on which a scheme for this purpose should be formulated; and
- (iv) To recommend the administrative arrangements therefor. The Working Group held five sittings. It also met Shri G. R. Kamat, Secretary, Agriculture, Shri S. Chakravarti, Secretary, Community Development and Cooperation, and Shri A. D. Pandit, Special Secretary, Agriculture, in the Government of

India, and got the benefit of their views. Mr. David Hopper of the Ford Foundation also participated in one of our meetings and assisted us in our deliberations.

2. INTENSIVE APPROACH

2.1. The idea of making an intensified approach in terms of local potential is indeed not a new one. The programme of Community Development, in its implementation, was always intended to be oriented to this approach. While a schematic budget was laid down on a uniform basis for the entire country, yet it was never contemplated that it should be treated as a rigid pattern of development to be adopted in every area irrespective of the varying local conditions and needs. A large measure of flexibility and discretion had therefore been given to the Blocks for reappropriating funds from one Head to another to suit local needs. Though, in view of the national priority for agriculture, the financial provision for Agricultural Development in the schematic budget could not be reduced, yet the agricultural programmes to be taken up in each Block within this provision were to be such as were most appropriate for it according to local conditions. Certain illustrative patterns of development were also indicated for areas with special problems and physical conditions, *viz.*, coastal areas, desert areas, hill areas, tribal areas, and Blocks near big cities and towns. For instance, in some arid zones, where cattle or sheep constituted the chief wealth of the people, the emphasis was to be on the development of livestock, sheep and wool. In hilly areas horticulture was to be the main activity, and in coastal areas, fishery. In Coastal Blocks it was permitted that an Extension Officer (Fisheries) may be provided instead of an Extension Officer (Animal Husbandry). In practice however this "intensive approach" was not consistently and systematically implemented. The staff and the resources provided in the Blocks, being inadequate the former being particularly inadequate in quality, could not by themselves have made any significant impact in this particular direction. Resources therefore continued to be uniformly dispersed over areas of varying potential.

2.2. A systematic and well-conceived move in this respect was made in 1960-61 with the introduction of the Intensive Agricultural District Programme in seven districts, later extended to eight more districts. The IADP is an intensive programme in the real sense, and has been comprehensively conceived and therefore calls for a heavy concentration of financial resources, supplies and services and much organisational effort. Obviously, such a programme cannot be multiplied too fast and in too large

an area in the immediate future. The Report (1961—63) of the Expert Committee on Assessment and Evaluation on IADP supports the view that that approach is difficult and results will take time to accrue. The programmes therefore now to be taken, though being intensive, should not entail intensification of staffing and certain ancillary services on the same scale as in the IADP. This modified approach would not, however, reduce the value of the IADP as a more comprehensive intensification which is bound to throw up experiences that will be of value even to our restricted approach.

2.3. Soon after the Emergency, the Ministry of Food and Agriculture advised the State Governments to take up intensive programmes of rice and millets in 40 and 99 districts, respectively. A programme of this nature is being taken up in 20 districts for wheat also. In addition a number of intensive programmes of varying sizes have been undertaken for certain "commodity" crops like cotton, oilseeds, groundnuts, etc. The current thinking seems to be that approximately 1,500 Blocks should be taken up under intensive programmes for various crops in the next three years starting with 300 Blocks 1964-65. In addition intensive programmes of fishery are being taken up in 600 Blocks, of poultry in about 500 Blocks, and of vegetables around 40 cities. It would thus be seen that "intensive approach" has now become the accepted basis of the agricultural policy.

2.4. It is a truism that in the field of agricultural production concentration should be in areas with assured water and land resources and where institutional credit structure is strong enough to support such intensive programmes, for obviously these are the areas where an immediate impact can be made. These were the criteria to be kept in view in the selection of the IADP districts. (Though in fact these criteria have not always been followed in actual selection of areas for intensive programmes.)

2.5. In the light of the above, the Working Group consider that the main value of their report would lie in reiterating this approach in a practical form and suggesting such basis of selection as are easy of application but at the same time are crucial from the operational point of view.

3. Classification of Blocks

3.1. There can in fact be only two clear categories of Blocks where definite programmes of agricultural improvement can be

taken up in an intensified form :

Category I : Those Blocks where impact programmes of agricultural development can be taken up; and

Category II : Blocks where agriculture is precarious and unstable, but there is considerable potential for undertaking intensive programmes of Animal Husbandry, dairying, fishery and sheep and wool development.

3.2. In between these two categories, there would be a very large number of Blocks where intensive programmes of agricultural production cannot at present be taken up for lack of adequate resource development. In such Blocks, programmes of water and land development in the nature of irrigation, soil conservation, rehabilitating soil fertility, drainage, flood control, reclamation, etc., will have to be first undertaken. This would entail technical surveys, preparation of Master Plans of development of these areas, planning of technical and personnel resources, and implementation of these programmes of development in a phased manner over a number of years, determined by the availability of resources.

3.3. We do not propose to give any criteria for the selection of this intermediate category of Blocks, which we will call Category III, because obviously it is not possible to do so on any well-defined basis. This category can be arrived at by a process of elimination, *i.e.*, after excluding Categories I and II. In any case intensive programmes of agricultural production cannot be taken up in these Blocks, except in the case of small favourable pockets within these Blocks like valleys and oases, till the land and soil conditions have been brought up to a certain level through programmes of water and land development.

3.4. In the opinion of the Group, Category I is the most important category where immediate attention should be concentrated as it offers the maximum promise of an immediate response to an intensive programme of increased agricultural production.

4. BASIS FOR SELECTION

4.1. Factors responsible for significant increase in agricultural production in any area are diverse, *viz.*, assured water supply, proper soil and land conditions, easy availability of credit for production requirements, an adequate supply line, an efficient extension service, suitable land tenure system, consolidated holdings, the enterprising nature of farmers, a well-served network of

communications to enable easy marketing, and essential overheads like rural electrification for irrigation and local processing of produce. Obviously, one cannot wait for all these factors to come into existence before starting intensive programmes of production. In fact, many of these will take their own time to develop as the general plans of development of the country go forward. Moreover, it is difficult, indeed impossible, to lay down with any definiteness a package of indicators, selected from above, for any practical application on a uniform basis because in a particular area one factor may offset the other.

4.2. However, there is one essential requirement for stable and increased agricultural production and that is assured water supply, whether from assured irrigation or rainfall. Most of the other essential services needed can be provided (and any defects in the existing system rectified with a view to concentration of efforts) if this basic factor of water supply is present. Availability of assured water is the key to the whole situation of farming at present.

4.3. Our conclusion is supported by a study conducted by Dr. V. G. Panse, Statistical Adviser of the Institute of Agricultural Research Statistics, I.C.A.R., on "Yield Trends of Rice and Wheat in the First Two Five-Year Plans in India" (for publication in the Journal of Indian Society of Agricultural Statistics). He has brought out that Andhra Pradesh and Madras have made a steady progress over both the Plans in increasing the yield of rice per acre. This progress is consistent and substantial enough to stand out as highly significant, notwithstanding the seasonal variation in yield in these States. Mysore (in the Second Plan) showed the next highest increase in the yield of rice, which stood the test of seasonal variations. It is to be noted that Andhra Pradesh and Mysore States have more than 90 per cent of their rice area irrigated. In Madras the Southern Divisions have irrigation for 94 per cent of their rice area, two other Divisions, Karnatak and Central, have 80 per cent or more, and the West Coast Division which has apparently no irrigation has a rainfall of over 120 inches. States with larger seasonal variations in the yield of rice have much lower rainfall, usually around 40 to 50 inches and also a much smaller fraction of their land under irrigation. On the other hand, the States with low annual variations in yield are characterised either by heavy rainfall or most extensive irrigation. Table given in Annexure II brings out the average yield of rice, annual rainfall and area of rice irrigated in different States.

4.4. In the case of wheat also (Annexure III) Bombay and Madhya Pradesh with smallest proportion of their wheat area

under irrigation show the largest coefficient of variation. Punjab which has 50 per cent of its wheat area under irrigation shows the lowest coefficient of variation. In Uttar Pradesh no doubt where considerable proportion of wheat area is under irrigation, a much lower coefficient should have been expected, but this has not been so probably because irrigation, which is normally light for wheat, is resorted to in many areas of the State only when considered absolutely necessary for saving the crop rather than as a normal measure for increasing yield. In Punjab the yield of wheat is the highest among the different States, leading to the inference that irrigation is a vital factor for increasing the yield of wheat per acre substantially.

4.5. The Group is therefore firmly of the view that only one criterion, that of assured water, should be adopted for classification of areas favourable from the point of view of making the intensive approach in the field of agricultural production. The simple criterion of assured water supply, besides being the key to the whole situation, will be easy of application and will more effectively, pointedly and in practical terms, emphasise the importance of the idea of concentration of efforts in favourable areas than would a complicated formula based on several factors. A definite programme could then be taken up in these areas to strengthen the supporting supplies and services.

4.6. Besides, assured water supply is so important from the farmer's point of view—indeed there is demand for wells even in areas where due to high cost of operation, the repaying capacity of the farmer may be severely strained—that by emphasising this factor in selecting areas for application of the intensive approach, we would secure further the great advantage of motivating the farmer to put in his best efforts. Giving to this factor an all-exclusive importance, would also help in focussing attention on the importance of further developing this facility. In the opinion of the experts associated with IADP, the other factors like organising supplies, extension of improved practices, credit, etc., will prove less difficult to deal with if the concentration is in areas of assured water supply. In these areas, the farmers themselves are likely to make the break-through as has already been demonstrated in some of the IADP areas.

5. ASSURED WATER SUPPLY

5.1. After considerable discussion the Group came to the conclusion that it was needless to attempt to define any concept of assured water supply because what is assured for one crop may be inadequate for another. The texture of the soil is another variable. It was impossible to conceive of all hypothetical situations and provide for these. The Group therefore considered it

more practical to leave the interpretation of the concept of assured water supply to local experts and planners who would know best whether an area fulfils this condition with reference to the agronomical situation, cropping pattern and the predominant crops in the area. In fact such a classification could be made only by the local people and not by any Central or State authorities by application of any criteria, howsoever comprehensive and objective it may be.

5.2. The Group would however suggest the following essential qualifications in the selection of areas of assured water supply :—

5.2.1. *Assured irrigation areas.*—The availability of adequate water should be realistically defined. It is important to ensure that areas which do not have assured water supply are not wrongly classified in that category. Examples have not been lacking of even areas in the command of irrigation projects not really having assured water supply—the supply being inadequate, untimely or being of a merely protective nature. Sometimes the distribution systems have been faulty.* In the case of State tubewells also it has been observed in many States that large acreages are classified as coming under “command” but in reality the availability of assured water is much less, thus greatly reducing the acreages which can count on water. In one IADP district the command area is listed as 450 acres from one tubewell while experience places this area only at 80 acres. More disappointments have come to farmers from mismanagement or failure to supply water by irrigation authorities than by anything else. This is a factor which, while it is of utmost importance from the farmer’s point of view, is not one which he could himself take care of; but without this factor being taken care of he will not make the effort to do the rest.

5.2.2. Intensive irrigation is of particular relevance and importance now with the introduction of chemical fertilisers as an essential means of intensifying agriculture. Formerly, when the use of chemical fertilisers was insignificant the irrigation networks could be spread far and wide, largely with a view to supplementing rainfall and providing protective irrigation. The note

*The intensive approach on the basis of assured water supply, incidentally, will also show some of the fallacies of the claims that irrigation has been provided in certain areas, but that farmers were reluctant to utilise it, it will also show some of the mistakes in our irrigation policies and plans. For example, in some major irrigation schemes water has been supplied in dribbles distributed over a much larger area than the source can really cope with, the result being that no area gets an adequate supply.

given at Annexure IV explains broadly the concept of assured water supply with reference to various agronomical considerations.

5.2.3. We are conscious of the question that may be raised as to what should be the percentage coverage of the area by irrigation which would make the Block eligible for selection for an intensive programme. We have carefully considered this question and feel that the fixation of an arbitrary figure for this purpose—it can only be an arbitrary figure—would not be satisfactory. All Blocks which qualify on the test of assured irrigation should be so classified. In actual implementation, however, the size of the programme will be determined by the availability of resources (financial, material and personnel), priority being given to those Blocks which have the largest areas under assured irrigation. However, there would be some advantage in selecting Blocks in fairly compact regions, even by selecting some not having the largest area under assured irrigation, as this will facilitate the organising of supplies and other administrative arrangements. But deviation from the indicated order of priority should not be made to any great extent.

5.2.4. (2) *Assured rainfall areas.*—It is even more difficult to indicate a sufficiently simple and practical indicator for selection of areas related to rainfall, because apart from the varying requirements of precipitation needed for different crops, the timeliness and the even spread of rainfall over the cropping season are equally important factors. It will be pointless to evolve sophisticated concepts and criteria for variations in various seasonal factors, for these would be difficult of practical application. We would therefore like to introduce here a more indirect and circumstantial basis of assessment, which should prove fairly satisfactory in actual practice. All the Blocks in the State can be classified as follows on the basis of the mean yield and mean spread of a given crop.

High spread High yield	High spread Medium yield	High spread Low yield
Medium spread High yield	Medium spread Medium yield	Medium spread Low yield
Low spread High yield	Low spread Medium yield	Low spread Low yield

The mean yield/spread refers to the mean yield per acre/spread of a given crop for the whole State. This will be the base for the determination of the High, Medium or Low Yield/Spread, for the Block. Those Blocks which have a high spread and high yield or medium spread and high yield or high spread and medium

yield should be selected for intensive programmes. This is an indirect index but it is very useful and can be applied more easily than other complex forms of assessment involving capabilities of land, availability of moisture, etc. This formula will automatically take into account all these factors.

5.2.5. Unfortunately Block-level estimates of production are not so far available. Hence it may be difficult to determine the mean yield with any degree of precision. So, to begin with, the selection may be done district wise, and the Blocks in those Districts taken up for intensive programmes.

5.2.6. Areas subject to frequent floods should be eliminated for the application of this intensified approach.

6. In case resources are not adequate enough to enable an intensive programme being taken up in all areas of assured irrigation and rainfall, as defined above, priority in selection should be given to areas of assured irrigation.

6.1. Along with intensive programmes of agriculture in favourable areas, the programmes of dairying, poultry and Animal Husbandry should also be promoted. This would provide supplementary income to the farmers and also raise their borrowing capacity for production-credit. Indeed "mixed farming" is of considerable importance in these areas, for these are the ones which normally happen to have comparatively higher density of population and unfavourable land-man ratio, e.g., fertile alluvial areas.

6.2. Programmes of fish cultivation should also be intensified in the Blocks which have sizeable water-area. Criteria for the selection of Blocks where such intensive fisheries programme should be taken up are already under the consideration of the Fourth Plan Working Group on Fisheries.

7. CATEGORY II

7.1. These are the Blocks where Agriculture is precarious or has no potential for any significant development. Generally speaking these would be the arid Blocks which receive a rainfall of 15 inches and below or the ones where extensive areas are under forest or the lands are saline and alkaline or eroded. At best there would be only pockets of fertile and productive land in valleys or plateaux. But generally the lands would be of only marginal productivity. Such areas depending upon the potential in each Block could be taken up for intensive programmes of Animal Husbandry, milk production, and sheep and wool development. Instead of agricultural crops the lands can best be utilised for growing grasses or trees.

7.2. Special attention should be given to dairying in these areas, because generally speaking, the arid or semi-arid areas are the ones which happen to have good cattle breeds. The policy of dairying and milk collection has so far been built around large urban consuming centres. While no doubt the areas surrounding these towns can continue to be developed as the milk sheds of the town milk supply schemes, it is equally necessary that areas which have good cattle breeds, yet are removed from big consuming centres, should not be neglected. Dairying should be promoted in these areas also on an extensive basis, supported by a number of milk collection schemes of optimum size. The milk could be sold in liquid form to smaller towns which lie within the milk shed of each such scheme and the remainder could be processed into butter, cheese or ghee and marketing.

7.3. In regard to sheep and wool development a mere programme of upgrading of breed and creation of shearing facilities here and there would not do. Well-conceived and integrated programmes of improvement of stock, shearing facilities, and of grading, carding, and marketing of wool are necessary. Likewise for the promotion of poultry also, need is for an integrated programme of supply of birds, hatching and brooding facilities, supply of feed at reasonable cost and marketing.

8. CATEGORY III

8.1. This is the inter-mediary category of Blocks which require development of the land and water resources as an essential pre-condition before any intensive programmes of agricultural production can be taken up. In fact, majority of the lands in India would come under this category. Lands on which good crops can be produced if the rainfall could be supplemented with irrigation as also much of the area under commands of new major irrigation works would be so classified, *e.g.*, lands under Chambal, Nagarjunasagar and Rajasthan Canal Projects. Lands served with irrigation but requiring to be drained, slopy lands which need soil conservation structures and lands infested with weeds also belong to this category.

8.2. For the development of such lands broad surveys have to be carried out to determine the nature of developmental measures, pertaining to irrigation, drainage, soil conservation and reclamation (including levelling). The surveys and the plans for the area should include among other things :—

- (a) Preparation of Master Plan for the development of the area;
- (b) Assessment of requirements of technical staff;

- (c) Requirements of normal staff;
- (d) People's participation required and likely to be available; and
- (e) the present strength of various institutions and measures for further strengthening them.

These surveys would be in the nature of pre-investment surveys for assessing the worthwhileness of the needed investment.

8.3. First priority for development should be given to those Blocks where sizeable areas can be brought under major, medium, or minor irrigation schemes. This would eliminate the time-lag which normally occurs in the utilisation of irrigation potential created.

9. PLANNING AND IMPLEMENTATION

9.1. The classification and selection of Blocks according to the criteria detailed above, can be done effectively, as we have mentioned earlier, only by the local authorities who are familiar with the conditions in their respective areas. We would suggest that this should be done by the regional level officers of Agriculture, Animal Husbandry, Fishery, and Horticulture, etc., in collaboration with the District-level officers. This preliminary selection having been done by the experts, and the pattern of development of each Block tentatively determined, it should be discussed and finalised by the Zila Parishads and Panchayat Samitis concerned.

9.2. It is obvious that a programme of development on the lines envisaged above cannot be taken up simultaneously in all the Blocks in view of the shortages of personnel, finances, and supplies and services. The ultimate phasing of the programmes of development in all these three categories of Blocks would therefore have to be done by the State Governments, keeping in view all these factors and appropriate priorities.

9.3. In regard to inter-departmental coordination in the implementation of these programmes, the Working Group on Inter-Departmental and Institutional Coordination for Agricultural Production, headed by the Union Minister of Agriculture, has already made very useful recommendations which have been sent to the State Governments. While we fully reiterate these recommendations, we would like to note that coordination itself is not enough, though undoubtedly necessary. The Departments concerned with the implementation of these programmes will have to develop the necessary competence and strength to bear the

additional burden so devolving on them. These programmes would require a high degree of technical supervision all along the line, backed by an efficient "supplies" system. The Departments would have to be fully geared to meet these needs. Strengthening would also be required of the soil-conservation, minor irrigation and plant protection wings in most States.

9.4. There is immediate need for evolving strains of seeds, particularly for rice, which would absorb heavy doses of fertilisers.

10. STAFFING

10.1. The Working Group carefully considered the question whether it was necessary to recommend any definite increase in staff in all these three categories of Blocks. The Ministry of Food and Agriculture and the Planning Commission have suggested the appointment of an extra Extension Officer, (Agriculture) and an optimum of 20 VLWs in the Blocks which are proposed to be taken up under Intensive Crop programmes. We however felt that we should not attempt to work out any uniform pattern of staffing in respect of the three categories of Blocks that we have proposed. The basic principle that has to be borne in mind is that the numbers should be adequate to serve the needs of the programme. We were definitely of the opinion that a "type" pattern for all Blocks should be avoided. It may be that in some of the intensive areas where the standards of cultivation are, relatively speaking, high, there would be comparatively greater need to increase the number of Extension Officers rather than VLWs or to provide VLWs and Extension Officers with higher specialised qualifications, because the level of knowledge of the present VLW may not be adequate for the farmers there. In certain areas on the other hand where the standards of cultivation have not reached a high level, the weightage in increase will be more in favour of VLWs than Extension Officers. The strength of the staff should be determined on the basis of requirements of each area.

10.2. In Category II Blocks the staff would be in the nature of Specialist VLWs and Extension Officers, depending on the nature of the programme taken up, e.g., Animal Husbandry, Poultry, sheep and wool development, etc.

10.3. In Category III Blocks the additional staff required would largely be of the nature of higher level technical experts to survey, prepare and execute plans of water and land development, like irrigation, soil conservation, drainage, etc. The normal extension staff would continue in these Blocks, till such time

as the Blocks qualify for entry into Category I consequent on water and land development measures having been implemented—whereafter consideration of staffing for Category I will apply to them.

11. TRAINING

11.1. (a) Specialised training should be given to the Extension staff in these Blocks with reference to the predominant crops there.

(b) The content of training in the Extension Training Centres should also be oriented to meet the requirements of these intensive programmes. There is need to make the training field and crop-oriented. Today the training imparted is of a generalised nature. It is therefore necessary that the Extension Training Centres should specialise in the main crops with reference to the agronomic conditions of the region in which they are located.

(c) VLWs who are, or are likely to be, posted in a particular region of the State should be sent to the Extension Training Centre in that region so that they may get practical field-oriented training in respect of the important crops of that region.

(d) The Extension Officers (Agriculture) posted in Blocks in a particular region of the State should be sent to the Extension Wing of the Agricultural College in that region for orientation courses so that they may also get the necessary acquaintance with the predominant crops and soil peculiarities in that region. This will, to a considerable extent, reduce the period of self-orientation and trial and error that every E.O. (Agriculture) has to go through on his first posting to a new area in getting to know the agronomic peculiarities of that area. The generalised course of study in the Agricultural College does not equip him fully with the practical field needs of each crop in varying agronomic conditions.

(e) Seminars should be organised of the Extension Officers (Agriculture) in the region at the concerned Extension Training Centre so that they may exchange their practical field experiences.

11.2. We consider the improvement in the quality of the staff as a far more important factor than mere increase in number. Training is an essential aid to that.

12. SUPPLIES AND SERVICES

12.1. In order to produce results it is necessary that resources both financial and material, as also adequate technical sup-

port, are made available in terms of the requirements of each Block. It is far better to take up a smaller number of Blocks for intensive development, consistent with the resources available, than to take up a larger number of Blocks and to fail to provide them with essential supplies and services.

12.2. The main concentration in these intensive programmes (Category I) should be on improved seeds, fertilisers, plant protection measures, credit, and proper use of water in combination with improved agricultural practices.

12.3. The present arrangements in many parts of the country for multiplication and distribution of improved seeds leave much to be desired, with the result that much that goes by the name of improved seeds is not really improved. Quality seed production and certification requires to be properly organised. We understand that the matter is already under the consideration of the Ministry of Food and Agriculture and hope that some satisfactory arrangements will soon be made in this behalf in all parts of the country.

12.4. The distribution of "supplies" is now gradually being handed over to cooperatives. This as a policy is highly desirable, because technical staff must be relieved of supply functions—which have continued to claim most of their attention to the detriment of their real work of providing technical support to the field workers. But it is equally important that cooperatives are enabled to handle these supply functions effectively and efficiently.* This would, among other things, require acceleration in the execution of the programme of rural roadworks. But if cooperative structure in any area is not strong enough to handle efficiently these supplies, there should be no hesitation in making alternative departmental arrangements, much as we would like to keep the technical functionaries out of it. This, however, should be a purely temporary phase.

12.5. The Extension Officer (Cooperation) should be fully involved in supervising and prompting the cooperatives to take over the supply functions. He is the man who is directly concerned with cooperative institutions, but so far his role has generally been confined to administrative supervision of the cooperative societies and matters pertaining to credit.

*In the case of seeds, quality is the crucial factor. Cooperatives have been generally hesitant to deal in the so-called improved seeds because they are unable to get more price for it than for ordinary consumption grains and consequently suffer losses by way of storage and interest charges.

13. INCENTIVES

13.1. We have emphasised earlier the importance of ensuring the right quality and training of the staff. An essential concomitant of it also is that adequate incentives should be provided to them. The need for giving incentives is particularly relevant in the case of the Village-level Worker. He is the key functionary, and the only front-line worker in the scheme of Extension Service, and yet he is the most maligned of all the functionaries. There are good, bad and indifferent workers, as, indeed, there are in any large organisation. But the limitations under which he works are also numerous. He has been the errand boy of all, at the beck and call of everyone. His area-charge has been large. He has not been given proper technical guidance and support, nor has been his "extension-education" fully backed up by the requisite supplies and services. His training, at least in the earlier phases, had been most inadequate. He has done the best he could under all these limitations.

13.2. It is only fair—in fact, very necessary—that some thought should be given to providing adequate material incentives to him. No doubt, in most States a certain percentage of promotions to the cadres of Extension Officers have been reserved for VLWs. But this does not go far enough as an incentive, for inevitably these promotions come their way only in due course, having regard to seniority and other factors. The Ministry of Community Development and Cooperation has a scheme of Prize Competition among VLWs on an All-India level. Here again, the incentive is not strong enough, for the area of operation of the scheme is wide, making the possibility of getting the prize too distant. What is needed is that there should be independent recognition of the work of a good VLW, without introducing the element of competition with others, or considerations like seniority, etc., (as would happen in the case of promotion to higher post). Accelerated increments, institution of a merit-grade of pay to which a VLW may be promoted without reference to seniority (though a reasonable minimum number of years of service may be prescribed), and some such positive incentives could be considered in this behalf.

13.3. We would suggest that a study be made of the existing situation in all the States and a set of positive incentives evolved for the VLWs. It is of utmost importance that the functionary on whom the scheme of Community Development and National Extension Service depends so much for its success is adequately motivated. No doubt, he is expected to discharge his duties to the best of his ability; yet reasonable incentives do need to be provided to him, particularly because promotions will be few and

far between though the responsibilities cast on him are heavy. A little additional financial liability on this score should not be grudged.

13.4. We would also like to mention here about Institutional incentives. With the introduction of Panchayati Raj the responsibility for the planning and implementation of programmes of agricultural development has devolved on Panchayati Raj bodies. It would be desirable to provide them with added motivation in this respect. We understand that a scheme of Productivity Competition for Blocks, is already under the consideration of the Ministry of Community Development and Cooperation, something on the lines of the Productivity Challenge Competition Scheme for Gaon Sabhas in U.P. Other States also have various Competition Schemes for Blocks/Panchayat Samitis, though these are not entirely related to performance in agricultural production, as for instance the Panchayat Industries Prize Competition scheme in Orissa.* We would recommend that a study be made of these schemes, and some incentives evolved—with indicators of assessment biased in favour of agricultural production.

14. OTHER PROGRAMMES

14.1. One of the terms of reference of the Working Group was to consider the need for other intensive programmes to diversify the rural economy and the basis on which a scheme for this purpose should be formulated. We have already dealt above with the need for diversification of the agricultural economy, by adoption of "mixed farming" and promotion of dairying, poultry-keeping, sheep and wool development, and improved pisciculture in areas of suitable potential. Other programmes directed to relieving the pressure on agricultural occupations would be those of rural industrialisation. Rural Industrialisation is a subject which has been talked about frequently, but no systematic attempt has so far been evident, such as would make any significant dent into the problem. The funds allocated have been pitifully small. A number of agencies are handling diverse

*Seventeen first prizes and seventeen second prizes of Rs. 50,000/- and Rs. 25,000/- each respectively are given to village Panchayats in the State at the rate of one first prize and one second prize per District/200 Panchayats. The prize money is utilised for setting up small-scale industries of various natures prescribed by the State Government.

Likewise, three prizes of Rs. 1 crore each are given annually to three best Panchayat Samitis in the State, one per Division, in the shape of medium-scale industries. The industries thus given so far are Small-Tractors factory, Straw Board factory and Switch-gear factory. A dividend of Rs. 5 lakhs per year will be given to the Samiti from the profits of the industry.

The indicators of assessment pertain to matters other than agriculture also.

schemes, more often than not, without coordination with each other and without a common direction. The subject of Rural Industrialisation is, indeed, a complicated one—complicated further by a lack of essential overheads like electrification and appropriate technologies. The subject would require detailed technical studies industry-wise and into technologies, if any worthwhile recommendations have to be made. This Working Group has no means to make such studies, and can only recommend that this should be looked into separately by another Working Group. We would, however, say that, granted essential overheads, too much need not be made of shortages of raw materials. Raw materials there are in plenty in rural areas, in the form of agricultural produce, which could form the base of various processing and consumer-goods industries.

14.2. A view appears to be forming among many leading thinkers in the country acquainted with the problems of increasing agricultural production that in order to give a real boost to agricultural production, it is not enough to programme only for agricultural improvement; an integrated programme of social and economic progress and agro-industrial development is needed in which the agriculturists should also be fully involved. Without attempting to dilate on this theme, we do wish to suggest that serious thought be given to this view-point. It is one way of reiterating the essential validity of the basic concept of Community Development that the ultimate roots of progress have to be looked for in the minds and hearts of the masses of people living in the countryside. They have to be roused, motivated, organised and assisted to work for their own advancement. It is not this concept that has been lacking in validity or wanting in vitality, the failures have been of implementation and of adherence to this concept.

15. THE FINAL WORD

15.1. While it can hardly be disputed that if resources are concentrated in areas which are favourably situated to receive them there is no reason why good results would not be achieved, it would be unwise to expect that this approach can produce any miracles. Such favourable areas occupy only a small part of the Indian agricultural landscape. Also, limitation of resources will necessitate the application of the intensive approach only according to a phased programme, as we have suggested. Nor will all the operational difficulties be solved so easily or quickly merely by the application of this approach. Nevertheless, we are convinced that in today's context an intensive approach, conceived in a fairly practical and simple way, as we have attempted to do, designed to produce a comparatively quick and

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demonstrable impact on agricultural production in favourably situated areas, is a wholly sound policy and could be justified on that basis itself. We can also hope that in the implementation of this policy valuable experiences will be gathered suitable for application to a wider field of effort.

15.2. Agriculture is the way of life of 70 per cent of our population. A deep impact could be made on agricultural production if only the millions of farmers all over the country are adequately motivated to produce more and put in their maximum effort to do so. Our approach so far has been a "programme" approach, with emphasis all the time on schemes, staffing pattern, coordination, in-puts, subsidies, and so on. All these are important, but time has come when we must seriously redirect our attention more and more to the farmer, whose business primarily it is to produce. He would produce more, if he is adequately motivated. One important factor in this motivation is the guarantee of getting reasonable prices for his produce, and of being able to easily market his produce. An example would be pertinent here. A programme of intensive cultivation of vegetables was promoted in some Eastern States a year back. The cultivators did take advantage of the facilities offered by the Government and produced more. But the increased produce could not be marketed and there was a slump in prices. It is futile to expect the farmer to produce more to earn less. The intensive approach in favourable areas is useful as a short-term measure, but the key to retrieve Indian agriculture from the stagnation of centuries lies in motivating each individual farmer to take to agriculture as a commercial proposition—not as a self-sufficient and "subsistence" economy that he has been used to over centuries of isolation. The pre-requisites for this are a proper price structure, easy availability of the needed supplies, and provision of essential overheads like communications and electrification, not to talk of the setting of a larger economic and social progress and transformation into which the policies and programmes of agricultural improvement have to be fitted. With the progressive exposure of the farmer to modern standards of life, we can count on him to make the effort to produce and to earn more.

SUMMARY OF RECOMMENDATIONS

1. The idea of making an intensified approach to agricultural production in terms of local potential is not a new one. The programme of Community Development itself was intended to be oriented to this approach, though it has not been systematically and consistently applied in practice..(2.1.). Then came the Intensive Agricultural

District Programme, the Intensive Crop Cultivation Programmes and Intensive Fishery, Poultry and vegetable programmes, based on the concept of concentration of effort in favourable areas.

(2.2 to 2.4.)

2. In the light of this the Working Group considered that the main value of their report would lie in reiterating this approach in a practical form and suggesting such basis of selection as are practical and simple in application but crucial from the operational point of view.

(2.5)

3. The Blocks should be categorised into the following three broad categories :—

(a) *Category I.*—Those Blocks where impact programmes of agricultural development can be immediately taken up.

(b) *Category II.*—Blocks where agriculture is precarious and insignificant but there is considerable potential for undertaking intensive programmes of Animal Husbandry, Dairying, Fishery, sheep and wool development, etc.

(c) *Category III.*—Blocks where programmes of water and land development in the nature of irrigation, soil conservation, drainage, flood control, levelling, etc., will have to be first undertaken before intensive production programmes become possible.

(3.1. and 3.2.)

4. Immediate attention should be concentrated on Category I, as it offers the advantage of quick response to a programme of increased agricultural production.

(3.4.)

5. Basis of Selection

(A) *Category I*

- (i) "Assured water" (assured irrigation or rainfall) should be the only criterion. Though factors responsible for increased agricultural production are diverse, yet this factor holds the key to the whole situation of farming at present. The crucial importance of assured water in increasing agricultural production is borne out by a study of Dr. V. G. Panse, Statistical Adviser, Institute of Agricultural Research Statistics, ICAR, on "Yield Trend of Wheat and Rice

in the First Two Five-Year Plans in India". (4.3. and 4.4.). Besides, this factor would be easier of practical application, than a complicated and sophisticated formula based on several factors. It is also of the highest importance from the farmer's point of view. (4.1. to 4.6.)

- (ii) The actual selection of Blocks in terms of this criterion should be done by local experts and planners who would know best whether an area fulfils this condition with reference to the agronomical situation, cropping pattern and the predominant crops in the area. (5.1.)
- (iii) The guiding principles in interpreting areas of "assured water" should be as follows :—
- (a) *Assured Irrigation Areas.*—The "command" of an irrigation project, major, medium or minor, to be taken into account should be realistically defined. It has been often noticed that the "command" is fixed at a much higher figure than the source can actually cope with. (5.2.)
- (b) *Assured Rainfall Areas.*—Here the Working Group has chosen an indirect and circumstantial index because of the practical difficulty in evolving a direct indicator. Blocks selected under "assured rainfall" should be those which have *high spread and high yield or medium spread and high yield or high spread and medium yield of the various crops in the State.* The high, medium or low yield/spread would be determined by taking the mean yield per acre/mean spread of a given crop for the State as base. This formula will automatically take into account the requirements of moisture for different crops, capabilities of land, etc. (5.2.4.)
- (iv) As Block-level estimates of production are not yet available the determination of areas of assured rainfall on the above basis should be done in terms of districts and the relevant Blocks falling in those districts selected for implementation of intensive programmes. (5.2.5.)

- (v) No arbitrary figure of minimum percentage-coverage of an area by irrigation for determining the eligibility of a Block for selection. All Blocks which come under this category should be so classified. In actual implementation, priorities should be determined by the availability of resources, Blocks having largest areas under assured irrigation being taken up first. But some consideration may also be given to selection of Blocks in compact regions for facility of administration.

(5.2.3.)

- (vi) If due to inadequacy of resources intensive programmes cannot be taken up in all Category I Blocks, priority in selection should be given to areas with assured irrigation over those with assured rainfall.

(6.)

- (vii) Along with intensive programmes of agriculture, programmes of dairying, poultry and fishery (if applicable) should also be promoted.

(6.1. and 6.2.)

- (viii) Areas subject to frequent floods should be excluded from the application of this intensified approach.

(5.2.6.)

(B) Category II

- (i) These are the Blocks which receive a rainfall of 15 inches and below or the ones where extensive areas are under forests or where lands are saline, alkaline or eroded. In such Blocks, depending on the potential in each Block the programmes of Animal Husbandry, milk production, poultry (common to all categories), and sheep and wool development, etc., could be taken up. Instead of agricultural crops the lands could best be utilised for growing grasses or trees.

(7.1.)

- (ii) Dairying should be promoted on an extensive scale in areas having good cattle breeds through a number of milk collection schemes of optimum size, without being necessarily linked up with large urban consuming centres. The milk could be sold in liquid form to smaller towns which lie within the milk shed of each such scheme and the surplus processed.

(7.2.)

- (iii) For sheep and wool development also an integrated programme of improvement of stock, shearing facilities, and of grading, carding and marketing should be drawn up. (7.3.)

(C) *Category III*

- (i) This category is arrived at by eliminating the Blocks under Categories I and II. Areas requiring land and water development would be classified under this. (8.1.)

- (ii) The first requirement in these Blocks is to have surveys carried out for various measures of Resource-development, e.g., irrigation, drainage, soil conservation, reclamation, etc., and Master Plans of development of the area prepared. (8.2.)

- (iii) Priority for development should be given to those Blocks where sizeable areas could be brought under major, medium or minor irrigation schemes. (8.3.)

6. The preliminary selection of Blocks in terms of these categories should be done by the Regional-level Officers of Agriculture, Animal Husbandry, Fishery, Horticulture, etc., in collaboration with the District-level Officers and then finalised by the Zila Parishads and Panchayat Samitis concerned. (9.1.). The ultimate phasing of the programme would of course be done by the State Governments in the light of the resources available, or likely to be available. (9.2.)

7. Soil conservation, minor irrigation and plant protection wings would need to be strengthened in most States. (9.3.)

8. There is need for evolving strains of seeds which would absorb heavy doses of fertilisers. (9.4.)

9. Staffing

- (a) *Category I.*—A "type" pattern of staffing for all Blocks should be avoided. Strength of the staff should be determined on the basis of the requirements

of each area. Indeed, in some Blocks where the standards of cultivation are high, there may be need to increase the number of Extension Officers rather than VLWs or to provide VLWs (and also Extension Officers) with higher qualifications.

(10.1.)

- (b) *Category II.*—The staff required would be in the nature of specialist VLWs and Extension Officers depending on the nature of the programme taken up, e.g., Animal Husbandry, poultry, sheep and wool development, etc.

(10.2.)

- (c) *Category III.*—The additional staff required would be in the nature of higher level technical experts to survey, prepare and execute plans of Area Development.

(10.3.)

10. Improvement in the quality of staff is of far greater importance than mere increase in number. A few suggestions have been given in para 11 to make the training of VLWs and Extension Officers (Agriculture) more field-oriented.

11. It is of utmost importance that the necessary supplies and services are made available in terms of the requirements of each Block. The size of the programme should be strictly determined by the available resources, and any indiscriminate expansion avoided.

(12.1.)

12. If cooperative structure in any area is not strong enough to handle the distribution of supplies efficiently there should be no hesitation in making alternative departmental arrangements, much as the Group would like to keep technical functionaries out of it. This however should be purely a temporary phase.

(12.4.)

13. A study should be made as to what positive incentives, by way of better service conditions, could be provided to the Village Level Worker. The incentives so far given do not go far enough.

(13.1. to 13.3.)

14. A study should also be made as to what incentives could be given to Panchayati Raj institutions, such as would

provide them with added motivation to organise programmes of increased agricultural production.

(13.4.)

15. As regards other intensive programmes to diversify the rural economy (one of the Terms of Reference of the Working Group), the Working Group felt that this would largely pertain to the programmes of Rural Industrialisation. Rural Industrialisation is a complicated subject and to make any worthwhile recommendation thereon, studies would have to be undertaken industry and technology-wise. The Working Group has no means to make such studies and therefore recommends that this should be studied separately.

(14.1.)

16. Finally, the Working Group is of the opinion that the "intensive approach" in favourable areas is useful only as a short-term measure. Miracles should not be expected of this approach in the overall agricultural situation, for such favourable areas occupy only a small part of the Indian agricultural landscape. A deep impact can be made on agricultural production if millions of farmers all over the country and adequately motivated to produce more. The pre-requisites for this are a proper price structure, easy availability of the needed supplies and services and provision of essential overheads like communications and rural electrification.

(15)

(Sd.) B. Mukerji

(Sd.) Douglas Ensminger

(Sd.) D. P. Singh

(Sd.) J. S. Patel

(Sd.) M. M. K. Wali

New Delhi,

Dated 21 May, 1964.

ANNEXURES

ANNEXURE I

No. 1(1)(3)/63-Agr.

GOVERNMENT OF INDIA
Ministry of Community Development & Cooperation
(Department of Community Development)

Krishni Bhavan, New Delhi.
November 2, 1963.

OFFICE MEMORANDUM

With the coverage of the entire country by C.D. Blocks, the implementation of a minimum programme in all the Blocks and the acceptance of the concept of integrated approach and team relationship with necessary arrangements for coordination, the time has come for an intensified approach in regard to selected programmes in selected areas with a view to achieving rapid results in different fields. Such an approach will facilitate concentration on and exploitation of the specific potential available in the Blocks for selected schemes and permit of intensified action in all sectors.

2. While increase in agricultural production is the necessary first step for accelerating the growth of the rural economy, it would still leave untackled the basic problems of the weaker sections—low income, low productivity and lack of continuous employment. The level of development reached in the Blocks after 10 years has not been sufficiently intensive to meet this gap. Indeed, even the existing level of development is presenting problems in post-Stage II Blocks. The need therefore is to bring about a diversification of the rural economy by stimulating the growth of non-agricultural as well as agricultural occupations. For instance, a programme of rural electrification and industrialisation on a good agricultural base would provide opportunities for employment to the weaker sections. Schemes for building up community assets would reassert the role of the community and its responsibility to its members.

3. To facilitate the adoption of an intensified approach in the field of agricultural production with a view to optimum use of all available resources at the Block level, it has been suggested that as a first step, C.D. Blocks should be categorised as follows :—

- (a) Blocks having assured water and land conditions capable of producing an immediate response to an impact programme for increasing agricultural production;
- (b) Blocks which have a big potential for agricultural development but require, as a pre-condition, land and water development;
- (c) Blocks which require long range development before any substantial increase in agricultural production can be expected.

In the first group, concentration would be on an action programme of the IADP type. In the second, attention would be largely given to the development of land and water resources to provide a base for advance in agricultural production; the emphasis would be on major public works programmes with particular attention to land reclamation, bunding, drainage, digging wells and

ponds, minor irrigation, construction of field channels, etc. In the third category of Blocks the need would be for special programmes taking into account local conditions, e.g., poultry, cattle breeding, wool rearing, dry farming, etc. The overall planning for certain programmes may, however, have to be done in terms of groups of blocks or parts of blocks, depending on the nature of the programme.

4. In regard to other intensive programmes, e.g., rural electrification, rural industrialisation, etc., the basis on which a scheme for this purpose should be formulated and selected will require consideration. Orissa Government have for instance introduced an integrated prize scheme for meritorious performance in various fields.

5. The question was considered at the Conference of State Ministers of Community Development and Panchayati Raj held at New Delhi on the 1st and 2nd August, 1963, and in pursuance of their recommendation, the Government of India have decided to set up a small Working Group with the following composition and terms of reference :

Composition :

- (1) Shri B. Mukerji, Managing Director, State Bank of India, Bombay Chairman
- (2) Dr. Douglas Ensminger, Representative in India, The Ford Foundation Member.
- (3) Dr. J. S. Patel, Agricultural Commissioner, I.C.A.R. (Ministry of Food and Agriculture) .. Member.
- (4) Shri D.P. Singh, Joint Secretary, Planning Commission Member.
- (5) Shri M. M. K. Wali, Deputy Secretary, Ministry of Community Development and Cooperation .. Member-Secretary.

Terms of Reference :

- (i) To suggest the criteria to be adopted for classification of Blocks for purposes of implementing selected programmes in the field of agricultural production;
- (ii) To recommend in broad terms the programmes for each category of Blocks on which resources should be concentrated in that field;
- (iii) To consider the need for other intensive programmes to diversify the rural economy and the basis on which a scheme for this purpose should be formulated; and
- (iv) To recommend the administrative arrangements therefor.

6. The Working Group is requested to submit its report, by the end of December, 1963.

Sd/- S. CHAKRAVARTI

Additional Secretary to the Govt. of India.

To

The Chairman and Members of the Working Group.
forwarded to :

- (1) Ministry of Food and Agriculture.
- (2) Planning Commission.
- (3) Development Commissioners of all State Governments and Union Territories.
- 4) All Officers and Sections in the Ministry.

Sd/- M. M. K. WALI

Deputy Secretary (Programmes)

ANNEXURE II

Average yield of rice, annual rainfall, and area of rice irrigated in different States.

State	Division	Pre-Plan			1st Plan			2nd Plan		Coefficient of variation (between years and within period) %
		Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Andhra Pradesh	Circar	1034	40.4	94.0	1205	42.4	94.1	1283	45.5	
	Carnatic	798	36.0	96.2	872	31.0	98.3	1294	40.3	
	Central	1064	32.5	93.0	1191	31.3	93.2	1314	31.3	
	State	1009	39.5	94.2	1164	40.3	94.7	1286	44.1	13.2 (8.3)*
Assam	Plains	930	93.3	25.3	941	94.7	32.5	944	92.0	6.7 (7.0)
Bihar	Patna	541	45.3	88.2	590	39.0	74.2	771	40.8	
	Tirhut	512	48.6	10.3	532	54.8	9.0	589	48.2	
	Bhagalpur	569	53.4	28.8	609	56.8	20.9	714	55.4	
	Chota Nagpur	807	55.8	7.7	751	52.2	10.8	756	51.8	
State		605	51.1	31.1	626	50.2	27.9	705	49.0	41.1(37.9)

ANNEXURE II—contd.

State	Division	Pre-Plan			1st Plan			2nd Plan		Coefficient of variation (between years and within period) %
		Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Bombay	Gujarat	617	33.2	2.7	511	41.3	5.9	689	51.2	
	Karnatak	893	45.0	42.0	861	48.4	37.0	1253	35.2	
	Konkon	1014	108.1	3.0	1111	123.1	4.1	1147	136.3	
	State	891	79.0	9.1	886	86.0	9.9	1012	94.5	23.8(24.2)
Madhya Pradesh	Jabalpore	471	62.0	4.7	466	48.8	5.4	490	57.6	
	Nagpur	732	48.5	44.0	776	49.2	42.4	789	58.2	
	Chattisgarh	686	56.6	22.9	694	46.5	22.9	807	54.7	
	State	671	56.4	23.2	681	46.9	23.1	778	55.3	31.0(29.2)
Madras	Carnatic	784	40.9	78.7	1051	41.7	83.2	1146	43.4	
	Central	1048	33.1	86.9	1218	34.5	93.1	1247	33.3	
	South	917	35.6	94.6	1064	36.2	94.7	1257	38.1	
	West Coast	797	137.9	0	828	128.1	0	1040	141.1	
State	881	61.1	67.4	1024	59.2	69.3	1184	61.5	11.5(7.8)	

*Figures in brackets are for coefficient of variation calculated from residual mean squares after eliminating linear trend within periods.

Uttar Pradesh	Meerut	628	38.4	60.0	552	35.6	[57.5	859	45.7	
	Rohilakhand	506	41.8	16.1	461	39.4	16.9	649	50.9	
	Allahabad	591	38.6	17.9	592	38.5	20.7	654	38.1	
	Gorakhpur	546	46.0	10.7	469	48.6	10.9	486	51.1	
	Lucknow	482	39.7	0.7	505	39.7	0.7	564	40.0	
	Faizabad	471	41.7	6.6	469	46.1	8.1	475	44.7	
	Banaras	486	47.2	0.7	434	37.2	0.5	535	39.6	
State		513	43.2	9.2	480	43.1	9.9	543	44.9	35.4(27.9)*
West Bengal	Burdwan	863	55.7	31.6	1002	49.7	36.9	1022	53.8	
	Presidency	790	70.5	7.9	817	71.8	11.0	826	68.6	
	State		833	61.8	21.8	922	59.2	25.7	936	60.3
Mysore (10 years)	Mysore				1108	48.9	91.8	1385	56.5	
	Bangalore				883	27.1	93.2	885	28.9	
	State					1057	43.9	92.1	1271	50.2

*Figures in brackets are for coefficient of variation calculated from residual mean squares after eliminating linear trend within periods.

ANNEXURE III

Average yield of wheat, annual rainfall, and area of wheat irrigated in different States

State	Division	Pre-Plan			1st Plan			2nd Plan		Coefficient of variation (between years) (within periods)
		Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	% Area irrigated	Average yield/acre (lb)	Average rainfall (in)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Punjab	Ambala	968	26.6	51.3	1078	21.6	56.6	1030	27.2	
	Amritsar	843	41.3	51.6	858	32.3	52.4	858	34.6	
	State	879	37.1	51.5	925	29.0	53.7	919	32.0	9.9(10.4)*
Uttar Pradesh	Meerut	768	35.1	59.7	848	33.1	60.7	828	40.7	
	Agra	740	29.6	80.2	896	26.5	85.1	879	33.2	
	Rohilakhand	582	40.5	26.2	644	36.5	24.1	686	45.7	
	Allahabad	672	37.7	59.0	795	34.2	66.1	833	36.8	
	Jhansi	624	35.4	23.0	673	35.3	22.0	832	36.9	
	Banaras	637	47.4	46.1	699	37.2	42.0	595	39.7	
	Gorakhpur	700	46.8	75.9	692	48.6	78.6	662	51.9	
	Lucknow	655	39.4	37.4	663	39.4	40.2	684	40.5	
	Faizabad	595	43.0	59.2	661	45.9	60.4	633	45.0	
State		661	38.9	50.3	729	37.2	51.5	745	41.4	30.7(25.2)

Bihar	Patna	438	46.9	47.7	536	39.3	28.2	516	40.8	
	Tirhut	542	47.7	19.3	511	53.2	10.0	492	47.1	
	Bhagalpur	491	51.5	5.7	546	51.0	3.6	460	52.7	
	State	488	48.4	26.4	531	47.4	15.0	494	45.9	39.8(32.4)
Madhya Pradesh	Jabalpore	464	58.8	1.8	544	46.3	2.4	515	51.5	
	Nagpur	340	45.3	3.0	466	43.0	5.6	413	42.9	
	Chattisgarh	292	54.3	0.2	444	46.5	0.2	327	54.1	
	Berar	281	38.1	1.5	352	32.8	1.9	382	32.7	
State	394	52.5	1.9	493	43.9	3.0	457	47.5	55.7(37.1)	
Bombay	Gujarat	312	29.9	11.3	350	30.9	15.7	293	26.2	
	Deccan	273	28.1	19.1	323	22.5	23.7	364	33.9	
	Karnatic	127	33.3	1.6	219	36.8	1.7	221	31.3	
	State	225	30.5	10.5	286	30.1	13.1	293	31.4	43.1(33.7)

*Figures in brackets are for coefficient of variation calculated from residual mean squares after eliminating linear trend within periods.

ANNEXURE IV

Assured Irrigation

The aim of irrigation is to ensure moisture supply to the crops at times and in depths to produce high yields and obtain maximum net returns. All the economically avoidable water losses such as seepage and deep percolation beyond the root zone of crops should be avoided as far as practicable, but water needs of crops must be met to meet the consumptive use, i.e., the water used for building up plant tissues and evapo-transpiration, through assured irrigation.

Water requirements generally vary with the nature of crops, the stage of crop growth and the weather conditions. Thus the irrigation interval should vary accordingly. The broad principle of timing irrigation is to apply water at the longest interval possible but before the crop receives a set-back reflecting fall in yield and economic returns. The crops differ in the extent to which they can permit depletion of soil moisture before irrigation. A crop such as rice loves wet conditions and needs to be irrigated frequently so that the moisture remains near field capacity and, perhaps, even above (field capacity is the condition which is attained a couple of days after irrigation). Potatoes, berseem and most *rabi* vegetables require moist conditions and suffer if more than 40-50% of the available water in the soil is depleted before irrigation is applied even though these crops are grown in winter when evaporative conditions are mild. Sugarcane too needs frequent irrigations at about 7-10 days interval, after the first irrigation, in the pre-monsoon season when evaporative conditions are severe. Maize also needs good moisture for rapid growth and would need fairly frequent irrigations at times when moisture needs cannot be met by other sources of moisture supply. Wheat has to be irrigated at intervals to prevent damage from white ants in early stages, to facilitate ear-emergence and to stimulate flowering and grain development during the period when evaporation is high.

Water demands generally change with the advance of season, being low in the early stages, rising to a maximum at the time of maximum growth, and declining thereafter. Each crop would, therefore, have a period of peak demand depending upon the stage of growth and the weather conditions. The periods of peak water demands have, therefore, to be taken into account for designing irrigation projects and water supply must be assured to meet the high demands at the peak periods specially.

Irrigated agriculture means higher investments in terms of fertiliser use, land levelling and other developmental costs, new implements, and adoption of plant protection measures. The water supply must, therefore, be sufficiently assured and made available according to the biological needs of the crops for optimum production so that the irrigation as a resource becomes attractive enough to the irrigated farmer. There is experimental evidence to show that response to improved practices is enhanced with optimum irrigation. From the point of view of crop production, therefore, water supplies have to be made in accordance with the crop needs and it should be possible to do so in the irrigation projects of the reservoir type without any difficulty. In such cases, the cropping patterns should be fixed according to the ecological requirements of the crops and economic considerations, the demands for water calculated according to the optimum crop needs, and supplies of water regulated accordingly.

In the case of diversion type of projects where supply of water depends upon the flow in the rivers, cropping patterns should be adjusted according to available water supplies and avenues should be explored to supplement the irrigation water supplies from major and medium works by the minor irrigation schemes so that the crop performance could be improved in years of deficient water supplies from the canals. It would be necessary to examine the water supply from some of the existing irrigation projects in relation to the cropping patterns to assess the extent to which irrigation supplies have fallen short of the optimum requirements of crops. There is some evidence to show that in some of the States, the water supply has been inadequate for optimum crop production. For example, in U.P. it is understood that water supply in the pre-monsoon period for sugarcane does not permit more than 3-4 irrigations and the general yield level and the quantum of investments are all low because of inadequate and unassured water supplies. For wheat also, there is provision for only one irrigation in the so-called *Kor* period. It would be desirable to undertake case study in some of the project areas and determine from the data of command area, irrigation intensity, water allowance, monthly capacity factors, project operating rules, and the cropping patterns whether the irrigation projects already constructed and operated serve the needs of individual cultivators in regard to water supplies at the proper time in adequate amounts.

In cases where despite best effort, the water supplies are in the nature of providing protective irrigation, rather than assured irrigation for optimum production, irrigation water must at least be made available at the critical periods when the crop is subject to the greatest water stress and irrigation would, therefore, give the highest response at that period. The canal closures during the critical period should, therefore, be scrupulously avoided.

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