

REPORT OF THE
SECOND JOINT INDO-AMERICAN TEAM
ON
AGRICULTURAL EDUCATION, RESEARCH AND EXTENSION

Issued By
THE INDIAN COUNCIL OF AGRICULTURAL RESEARCH

New Delhi, India

June. 1960

Dear Mr. Damle:

It is indeed a pleasure to transmit herewith the Report of the Second Joint Indo-American Team on Agricultural Education, Research and Extension.

Members of the Team visited most of the Indian States to discuss with Government officials, educators and others the diverse and complex problems related to these three activities. In connection with these discussions, they were privileged to inspect facilities and review the work of many research institutes, Commodity Committees, agricultural and veterinary colleges and Community Development and National Extension Blocks.

The Team was guided by the terms of reference set forth in a Government of India Resolution.

Progress of work during the past five years is reviewed in the Report; supplementary recommendations are presented relative to support of agricultural education, research and extension in the Third Five Year Plan; and the Inter-institutional Agreement with five American universities is reviewed and recommendations made for its continuance.

The views of the Team, as projected in the Report, with one exception, have the unanimous approval of the members.

We believe that recommendations of the Team, if implemented, will strengthen agricultural education, research and extension, and contribute greatly to India's economic and social development.

Yours sincerely,

M. S. Randhawa
Chairman
Second Joint Indo-American
Team

Shri K. R. Damle, I.C.S.
Secretary
Department of Agriculture
Ministry of Food & Agriculture
New Delhi

Contents

<u>Chapter I</u> - Introduction	1
First Joint Indo-American Team	2
Second Joint Indo-American Team	3
Terms of Reference	4
Mode of Operation	4
Scope of Report	5
Acknowledgement	6
<u>Chapter II</u> - Education	7
Summary of First Team's Report	7
Current Situation	8
Teaching Below College Level	8
Under-graduate Level	8
Post-graduate Level	9
Agricultural Universities	9
Indian Council of Agricultural Education	10
Basic Principles	10
Agricultural Schools	11
Education at Under-graduate Level	12
Agriculture	12
Veterinary	12
Animal Husbandry	13
Home Science	13
Extension	13
Post-graduate Training	14
Agricultural Universities	14

Goals	15
Administrative Organization	17
Duties of University Administrators	18
Chief Administrator	18
Division Heads	18
Department Heads	19
Teaching	19
Student Body	21
Research	21
Agricultural Education System - Discussion	21
High Schools	22
Under-graduate Colleges	23
Post-graduate Colleges	24
<u>Chapter III</u> - Research	25
Research Organizations and Agencies	25
Central Research Institutes	27
Indian Council of Agricultural Research	27
Commodity Committees	28
Ministry of Food & Agriculture (Department of Agriculture)	29
State Departments and Institutions	29
Other Institutions	30
Summary of First Team Report	30
Financial Support	31
Organization	31

Current Situation	32
Basic Principles of Agricultural Research	36
Identification of Problems	37
Building a More Effective Research Programme	38
Agricultural Research Policy	39
Agricultural Research	39
Organization for Effective Agricultural Research	40
Central Agricultural Research Organization	41
State Research Organization	45
Coordination of Centre-State Research	46
Increasing Incentives, Morale and Scientific Integrity of Agricultural Research Scientists	48
Integration of Education and Research	49
<u>Chapter IV - Extension</u>	51
Current Situation	51
Basic Principles	52
Objectives	53
Education	53
Organization and Administration	53
Financial Support and Control	53
Personnel	54
Programmes	54
Coordination	54
Community Development Organization	55
Central Ministry of Community Development	55

Ministry of Food & Agriculture	55
States	55
Identification of problems	56
Objectives	56
Education	56
Organization and Administration	57
At the National Level	57
At the State Level	59
Financial Support and Control	60
Extension Personnel	60
Selection	60
Adequate Numbers	60
Training	61
Incentives	61
Programme Participation	62
Home Science	62
Youth Work	62
Relation of Research, Education and Extension	63
<u>Chapter V</u> - Factors Common to Research, Teaching and Extension That Influence Food Production	64
Resources and Allocations	64
Administration	66
<u>Chapter VI</u> - Land and Livestock Relationships	69
<u>Chapter VII</u> - Inter-University Contract Programme	72

<u>Chapter VIII</u> - Summary of Principal Recommendations	78
Agricultural Education	78
Below College Level	78
Under-graduate Level	79
Post-graduate	80
Agricultural University	80
I.C.A.E.	81
General	81
Research	82
Extension	84
Inter-University Contract Programme	86
Appendix I - A Minute of Dissent	88
Appendix II - Supplementary Note by Indian Members	91
Appendix III - Government of India Resolution constituting the Team - Terms of Reference	93
Appendix IV - Places visited and Officials met by the Team	96
Appendix V - Questionnaire issued to State Governments	107
Appendix VI - Questionnaire issued to Commodity Committees	115
Appendix VII - Questionnaire issued to Central Institutes	119
Appendix VIII - Bio-data of Team Members	120

CHAPTER I

I N T R O D U C T I O N

This report of the Second Joint Indo-American Team on Agricultural Education, Research and Extension is based on a critical analysis of the requirements of Indian agriculture in the context of developmental planning. The basic premises from which the report is developed are:

1. that greatly increased agricultural production is an absolute necessity if India is to attain the objectives of the Third and subsequent Five Year Plans, and
2. that the key to increased and more efficient agricultural production is a coordinated system of agricultural education, research and extension that is suited to the unique characteristics and requirements of India's cultivators. Cognizance also was taken of the fact that such a system, to be most effective, must be buttressed by (i) appropriate allocation of resources, (ii) efficient administration at all levels, and (iii) unity of purpose expressed in common objectives and integrated programmes of the Centre and States.

India faces a food crisis. The magnitude of the problem and steps to meet it are set forth in a recent report* which has been widely circulated and favourably received throughout India. This report stresses the urgency of the situation. It is pointed out, for example, that to produce the quantity of foodgrains needed by the end of the Third Five Year Plan, the rate of production increase must average 8.2 per cent per year compared with an average of 2.3 per cent from 1949-50 to 1958-59, and an average of 3.2 per cent from 1952-53 to 1958-59. Thus the rate of food production increase must be trebled if needs are to be met. This is indeed a task of staggering magnitude.

* The Agricultural Production Team sponsored by the Ford Foundation. Report on India's Food Crisis and Steps to Meet it. 259 pp., Ministry of Food and Agriculture and Ministry of Community Development and Cooperation, New Delhi. April, 1959.

To accelerate the rate of change in food production, practices rooted in centuries of tradition must be evaluated. Those practices that fail to meet the tests and standards of science and technology must be discarded and new ones developed to take their place. It is manifestly not enough merely to discover and recover new facts and information in accordance with scientific principles and procedures. Only through understanding and acceptance of new practices by cultivators will changes occur and the rate of food production increase.

Research is required to solve cultivators' problems; education is necessary to develop research talents through which science and technology serve agriculture. Extension is the only effective means of informing cultivators of research findings and of securing their acceptance of new ideas that can accelerate the rate of change in food production; education, in turn is required to develop the extension competence and leadership necessary to bridge the gap between research workers and cultivators.

FIRST JOINT INDO-AMERICAN TEAM

A project for assistance to agricultural research, education and extension organisations in India was developed under the Technical Cooperation Programme between the Government of India and the Government of the United States, as Operational Agreement No.28. It was signed by the representatives of the two Governments on April 30, 1954.

This project provides for various types of technical assistance in the fields of agricultural education and research. As a major phase under this project, a Joint Team, consisting of five Indian representatives and three American specialists in agricultural research and education was set up in 1954. The Team made a comparative study of the organization, functions and working of Indian and American agricultural research institutes and colleges. Its recommendations for strengthening the programme of research and education in India were based on the results of this study.

The recommendations of the First Team were accepted in principle by the Government of India, but only a few of them have been implemented by the Central and State Governments. Some of the important recommendations could not be implemented as the Report was submitted after the Second Five Year Plan had been formulated.

Since the First Indo-American Team submitted its report, nine new colleges of agriculture and six of animal husbandry have been established in the States. The Indian Agricultural Research Institute, New Delhi, and the Indian Veterinary Research Institute, Izatnagar, have initiated post-graduate training in agriculture and animal husbandry, respectively. Eighteen agricultural and two veterinary colleges also give post-graduate training. Further, a few more colleges have also been recognized for the introduction of post-graduate courses, but implementation has been delayed as they were not included in the Second Five Year Plan. This Team was impressed by the extensive building programme being undertaken to strengthen agricultural research and teaching facilities.

One of the landmarks in the implementation of the recommendation of the first Team is the establishment of the first Agricultural University in India at Rudrapur, in Uttar Pradesh. Proposals are being developed for the establishment of such Universities in other parts of the country, particularly in Punjab, West Bengal, Madras, Bombay, Bihar and Andhra Pradesh.

Research and teaching facilities in agriculture and animal husbandry have been strengthened both at the Centre and in the States through the valuable help obtained under the inter-institutional programme.

The immediate result of the recommendation of the First Team is the expansion of the Extension Section of the I.C.A.R. and its consolidation into a separate Wing under the Ministry of Food and Agriculture headed by a separate Extension Commissioner. The Wing assists the State Extension organizations in the orderly implementation of schemes and also deals with extension educational programmes and aspects concerned with technological improvements. It is also charged with the distribution of extension literature, audio-visual aids, etc.

SECOND JOINT INDO-AMERICAN TEAM

Far-reaching developments have taken place in India since the First Joint Indo-American Team made its report. The States have been reorganized, national plans have developed increased momentum and the importance of agriculture in the economy of the nation has been increasingly realised. The task of organization, support and coordination to ensure maximum efficiency has become increasingly more urgent and compelling with the growing realisation of the role of technical and technological development. The Government of India and the T.C.M. authorities, therefore, came to the conclusion that a Second Joint Indo-American Team should assess the progress made during the past five year period and recommend a course of action for the Third Five-Year Plan.

The main objective of the Third Five Year Plan is to carry further the process which was started under the First and the Second Five Year Plans and to make India's economy self-reliant and self-generating. The objective is rapid industrialization and economic development made possible by corresponding development in the agricultural sector. This is brought out clearly by the Ministry of Food and Agriculture in the paper "Approach to Agricultural Development in the III Five Year Plan (September, 1959)". It is in this context that a careful appraisal of agricultural education, research and extension has been undertaken by the Second Team.

TERMS OF REFERENCE

In Appendix 3 is furnished the copy of the Government of India Resolution appointing the Second Joint Indo-American Team on Agricultural Education, Research and Extension. Under Para 2 of the Resolution are found the terms of reference which lay down:

- (i) that evaluation of the progress of work should be done in the fields of agricultural education, research and extension during the past five years,
- (ii) supplementary recommendations should be developed for these three fields of activities with special reference to the Third Five Year Plan, and
- (iii) the inter-institutional agreement concluded in 1955 with the five Land-Grant Universities of the U.S.A. should be reviewed to find out whether it should be continued during the Third Plan period.

It has been clearly stated therein that the Government of India's intention is that the work of the Second Team should cover all aspects of agricultural research, education and extension, including animal husbandry, veterinary science and allied subjects.

MODE OF OPERATION

To secure background information, a very intensive programme of visits by members of the Team to representative institutions in different parts of the country was found necessary. These visits included discussions with administrators and scientists at various levels.

On the map (fig.1) are shown the places visited by the Team, while in Appendix IV is presented a list of places visited and the officials met by the Team during their itinerary. A careful record of the salient features of each visit with observations made has been listed along with the minutes of discussion with each group or individual and at each centre or place visited. These notes were reviewed by the Team at convenient intervals.

At the same time, the Team issued questionnaires to the different institutions or agencies in order to secure factual information and data to assess the current position and help formulate recommendations for the future. Specimen forms of ~~and~~ such questionnaires issued will be found in Appendices V, VI, VII and ~~VIII~~. Replies received were analysed and summaries made available to the Members.

The itinerary included visits to representative centres or institutions of all types below the college level, at the under-graduate stage and at the post-graduate stage. Thus, extension training centres, rural institutes, cooperative agencies, central institutes, regional stations, commodity committees, PIRRCOM centres, experiment stations, community development blocks, agricultural and veterinary and home science colleges, dairy and livestock farms were visited. The Team was privileged to meet highly placed authorities such as Ministers, Heads of Institutions and Departments, and Secretaries to Government in Agricultural Departments. Thus the Team obtained an impressive mass of information to use in formulating judgements.

SCOPE OF REPORT

This report has not attempted to evaluate any of the existing institutions or agencies in the field of agricultural education, research and extension. Such evaluation would have involved a task far beyond the scope of work of this Team. The task, therefore, to which the Team set itself from the very outset was to secure as much reliable and accurate information as possible on which to base judgements relative to current policies and activities.

In accordance with the terms of reference the Team has endeavoured in its report to present its recommendations under the major headings of Agricultural Education, Research and Extension. Agriculture has been treated broadly to include animal husbandry, veterinary science, home science and other related fields or activities. The recommendations made by the First Team have been kept in mind in assessing the current situation and in enunciating the basic principles, from which the recommendations have been developed.

ACKNOWLEDGEMENTS

Grateful acknowledgement is made of the helpful assistance given by government officials, educators, and others with whom the Team discussed problems and programmes associated with agricultural research, education and extension. The Team also wants to thank members of the U. S. Technical Cooperation Mission staff and the Group Leaders of the five Universities having inter-institutional contract programmes in India for their valuable counsel and assistance. Helpful suggestions also were given by members of the Ford and Rockefeller Foundations stationed in India.

Special praise and commendation are due to Dr. Frank W. Parker, formerly Chief Agriculturist of the U. S. Technical Cooperation Mission. Though he did not participate in discussions with the Team, his contribution to the progress that is being made in strengthening and coordinating agricultural research, teaching and extension is widely recognized and appreciated throughout India.

CHAPTER IIE D U C A T I O NSummary of First Team's Report

The First Joint Indo-American Team made a close study of the educational facilities available in agriculture, veterinary science and allied subjects at all levels from the high school to the post-graduate level. The Team specifically recommended that the Indian Agricultural Research Institute and the Indian Veterinary Research Institute should be developed into strong post-graduate centres. Further, that cooperation of other national institutes, such as the National Dairy Research Institute, the Central Rice Research Institute, the Central Potato Research Institute, etc., and the facilities available at the various national scientific laboratories should be used for post-graduate training. The Team further suggested that post-graduate training at the colleges should be taken up only where significant research was already being done and where the staff was adequately qualified to perform teaching and research duties. The Team also envisaged the development, on a regional basis, of five agricultural colleges and five veterinary colleges into strong centres of post-graduate teaching.

The Team recommended that the agricultural colleges introduce training courses for extension workers and that necessary additions to the curricula be developed to promote under-graduate specialisation in extension. The Team also pointed out the need to provide research opportunities for the teaching staff, particularly in the veterinary colleges, as a preliminary to upgrading of the institutions to post-graduate training centres. The Team envisaged that one faculty member should be able to deal with 15 to 20 students, and that the curricula of the veterinary colleges should be overhauled by a suitable agency to be set up by the Indian Council of Agricultural Education. Similarly, measures should be taken to scrutinize syllabi, text books and teaching methods. The Team also recommended that the current system of University Examinations should be overhauled. They suggested that education in animal husbandry be strengthened. The library facilities available in the veterinary colleges were also found to be inadequate, and the Team recommended that the State Governments should provide sufficient funds to meet the needs of the colleges for books, buildings and equipment. They also emphasized the need for increasing the number of home science colleges and locating them alongside agricultural colleges with central subsidy if necessary. The Team was strongly of the opinion that the I.C.A.E. should play an increasingly

important part in the development of higher education in agriculture, veterinary science and related fields and that it should constitute a forum, partly through a Journal of Agricultural Education, for the discussion of problems relating to education at all levels. They also endorsed the recommendation of the University Education Commission that autonomous Rural Universities be established and accorded the same facilities as are available to other Universities, including substantial grants-in-aid from the Centre to secure efficiency of operation. The Team was of the view that establishment of such Universities in the Tarai (U.P.) at Haringhatta (West Bengal), Patna (Bihar), Bhubaneswar (Orissa), Anand (Bombay) and Kerala should be considered. The Team was of the opinion that Rural Institutes could not be on par with Rural Universities nor with vocational agricultural schools. Development of more vocational agricultural schools of the Manjri type was recommended.

Current Situation

Teaching Below College Level

At present agricultural education below college level consists of teaching agriculture as one of the subjects in multi-purpose high schools and as a vocational subject in the Manjri type schools. In addition, there are the integrated extension training centres where a two-year course is given to candidates to be trained as VLWs, while in the Rural Institutes similar candidates are being given two-year training leading to the award of a certificate. There are several other schools which also teach agriculture. Many committees have examined these various systems of agricultural education, and the Secondary Education Commission also studied to some extent the question of teaching agriculture along with other subjects at high schools.

Under-graduate Level

Steps have been taken to implement some of the recommendations of the First Team, in that many colleges have now developed extension wings and there has been considerable revision of curricula in veterinary colleges.

There has also been some change in the examination system though not on the scale envisaged by the First Team. The quality of Animal Husbandry teaching has improved but much remains to be done. Further improvements of library facilities and use are needed. Some progress in the teaching of home science has also taken place, mostly in women's colleges, but there is only one home science college that has been established near an agricultural college. Even here advantage has not been taken of the possibility to integrate curricula to avoid duplication of staff and laboratories.

It was observed that textbooks used were not sufficiently applicable or were obsolete for present day teaching. There is a great dearth of text books written by Indian authors to suit Indian conditions. The I.C.A.R. has recently launched a commendable scheme to support and encourage Indian scientists to write textbooks. Such a programme when greatly expanded should make up the deficiency.

It has also come to our notice that degree courses in agriculture have been instituted in some colleges where staff and facilities are grossly inadequate.

The private colleges are outside the purview of the I.C.A.R. and its education arm, the I.C.A.E. There is thus no single agency charged with ensuring an adequate and uniform standard of teaching and facilities at all colleges.

Post-graduate Level

Both the State and the Central Governments have taken substantial steps forward in post-graduate education. Training facilities have been provided at I.A.R.I., New Delhi, for as many as 150 students annually for education up to M.Sc. and Ph.D. standard. This has been achieved mainly with Rockefeller Foundation support and further supplemented by Government of India grants. Similarly, the IVRI has developed a post-graduate training course, though of a different pattern. Post-graduate training centres have been developed on a regional basis at Coimbatore and Nagpur. The Government of India have not decided as to whether the Nagpur Centre should continue, pending the examination of a report of a special committee appointed for the purpose. Post-graduate facilities on a regional basis have also been made available for veterinary science at Madras and Mathura. Of all the post-graduate centres, the I.A.R.I. is the only institution which has autonomy to award degrees and to shape its curricula according to the felt needs and particularly in conformity with the recommendations of the First Team. It is unfortunate that such development has not taken place at the I.V.R.I.

Agricultural Universities

Several States have made active moves towards setting up agricultural universities. Of these, the one that has taken tangible shape is the U. P. Agricultural University. Here on a farm of 16,000 acres, the U. P. Government, with the assistance of the Government of India and the T. C. M., proposes to develop

an agricultural university with constituent colleges of agriculture, veterinary science, home science, science and liberal arts, and technology. Admissions to this University will start in July, 1960. With the active help of American specialists, suitable curricula are being developed, and staff and facility arrangements are being built.

Indian Council of Agricultural Education

Three The Indian Council of Agricultural Education organized ~~two~~ seminars on teaching methods, one at Trivandrum and the other at ~~Masoorie~~ ^{Bowhay}. These helped greatly to reorient teaching methods in agriculture/veterinary colleges and also to initiate steps for bringing about a change in syllabi, examination methods, and many other aspects of education. The status of agriculture/veterinary education should be reviewed periodically by I.C.A.E. It is recommended that the I.C.A.E. staff be strengthened in order that it may discharge its functions satisfactorily.

Basic Principles

Education is the basis of all progress. This is no less true of agriculture than it is of other sectors of the economy.

Education to be most productive must be fashioned to the needs of the country and developed with a clear understanding of the objectives to be achieved.

Food production is recognized as the most outstanding problem of India. Therefore, all agricultural education from primary grades to the University level should be so organized as to make maximum contribution towards increasing food production. This is not to mean that training should be restricted to vocational type courses. Rather, it is important that the educational process should produce specialists who have a clear understanding of all aspects of agriculture and the place of their specialization in the whole, as well as the contributions that might rightly be expected of them.

Agricultural education must rest on a foundation of research. Facts, not opinions, must be the starting point. It is not enough to collect presently known facts. These must be translated into action and constant search must be made to discover new facts so that agriculture in all its phases may continue to progress.

It is very important that steps be taken to ensure that agricultural education in India is based on a well defined pattern. This can be accomplished when each part of the pattern has a special function to perform, and when each is complementary to the whole.

Agricultural Schools

- (a) Vocational Education (Manjri Type) Schools.
- (b) Agricultural and General High Schools.
- (c) Special Schools.

This Team is of the view that the education to be imparted to rural youth must be so modeled as to meet the requirement at different stages of their growth and development. It has been estimated that over 60 per cent of the rural youth break away from schools after the 7th or 8th standard while about 80 per cent break away after the 10th standard. Since most of these youths will revert to the villages where agriculture is the primary vocation, it is necessary that agriculture should receive a strong emphasis both in the stream of general high school education and in the special vocational schools. The First Team, therefore, recommended that vocational agricultural schools of the Manjri type should be established in large numbers. ³ Under the Third Plan, it is proposed to establish ~~100~~ schools of this type and to have ultimately one school for each district. To achieve this goal and to ensure the number of suitable entrants, the Government should offer stipends to cover the expenses.

The main problem in teaching vocational agriculture is that of securing trained teachers. This problem is not peculiar to teaching of agriculture only. The Team was informed that separate teacher training institutions are being set up. This is a desirable step and will help alleviate the shortage of trained vocational agriculture teachers, provided the minimum requirement, i.e., B.Sc. Agriculture, for teachers is not sacrificed. Even pure science graduates are now being pressed into service for teaching agriculture in some of the high schools.

Equally important is the need for attaching a suitable demonstration and training farm to each multi-purpose high school. Agriculture can never be taught properly through lectures, and when such a thing is attempted by ill-trained teachers who may not even be agricultural graduates, the results are bound to be disappointing. Teaching of agriculture at high schools should be restricted to such centres as have a farm of sufficient size to represent the pattern of agriculture in that region, and teaching should be entrusted to agricultural graduates with teacher training qualifications.

The Team endorses the observations made by the First Team that the Rural Institutes are neither vocational nor do they fit into the present agricultural education pattern. It has been suggested that these Institutes should be converted into either vocational agricultural schools of the Manjri type or into integrated extension training centres to meet the needs of the V.L.W. training programme. The control of these institutes, if converted, would vest in the Ministry of Food and Agriculture and not in the Education Ministry.

Education at Under-Graduate Level

Agriculture

Agricultural colleges should reorient their perspective and reorganize their curricula in order that they may be able to provide proper training in modern methods of agriculture. Traditional courses should be altered and greater emphasis given to application. As indicated elsewhere, courses in Botany should have a more direct bearing on crop production. Similarly, the subject of Soils should not be limited to a study of the chemistry of soils. Soil physics, soil plant relationship, soil water relationship, soil conservation and soil erosion should be fully covered by the syllabus. The agricultural colleges cannot meet the needs of the future without the inclusion of courses in soil conservation, agricultural extension and agricultural economics including farm management. It follows that new courses will be required in the curriculum. This emphasizes the need for elective subjects, particularly in the last two years.

It is not our purpose to blueprint a curriculum for agricultural colleges. Rather, we aim at directing attention to those aspects of education which are not receiving adequate attention at present or are entirely neglected, so that changes may be made to meet the requirements of the country.

The I.C.A.E. has a very important task confronting it in attaining more uniform entrance requirements, duration of courses, choice of electives, and graduation requirements. These are all inter-related matters.

Veterinary

The final solution of the land-livestock relationship problem in India is dependent in a large degree on a proper assessment of the place of livestock in future Indian agriculture. Once something is done in this regard, the way would be prepared for a planned approach to the solution of this problem. In order to meet the many demands that will be faced, it will be necessary that animal husbandry be given increased importance in agricultural education.

The demands visualized for veterinary science will require that much more time be spent in training practicing veterinarians.

Animal Husbandry

While a veterinary graduate is at present trained to undertake both animal health and animal husbandry programmes, there is a need for greater specialization. Animal husbandry should be treated as a major subject of study and developed into a strong independent department in agricultural or veterinary colleges, as the case may be. Animal husbandry students will, in addition to the courses taught in animal husbandry, require certain courses in veterinary medicine, soil science and crop production.

Home Science

Great progress in the field of home science education can be made in the immediate future. A standard curriculum for Home Science Colleges, suited to Indian rural conditions, should be prepared by an appropriate committee after a thorough examination of the existing curricula in India as well as in foreign countries.

One Home Science college per State should be the minimum goal. As suggested elsewhere, these colleges should be located close to an agricultural college or form part of an Agricultural University.

Extension

The impact of agriculture, veterinary science, animal husbandry and home science graduates on the future of Indian agriculture and rural economy will be in direct proportion to their ability to utilize their knowledge for increasing food production, improving methods of marketing and raising the standard of rural life.

Instruction in Extension methods should be available on an elective basis to all students. It should also be recommended strongly to those who expect to enter the Extension Service, or to engage in business or other activities which bring them into close contact with the cultivator.

Extension workers should have sound training in physical sciences as well as in social sciences including Rural Sociology, Economics, Agricultural Economics, etc. It is expected that these courses will be available to all students. A relatively small staff will suffice for teaching extension methods.

Separate model farms on profitable business method with poultry, horticulture, and dairy units would be an advantage in convincing students of the value of the various scientific methods of agriculture advocated in the institution.

Post-Graduate Training

It would not be conducive to progress if a large number of institutions are allowed to develop into post-graduate training centres without changes in the curricula, methods of teaching, and examination system as envisaged by the First Team.

Under the stress of the present widespread demand for developing almost every college into a post-graduate centre, the requirements for quality and standard of education should not be sacrificed. No college should be developed into a post-graduate centre without a close and critical examination of its resources and potentialities by a competent body of agricultural scientists and educators, established in the Indian Council of Agricultural Education. Only after a favourable report is made by that body should any aid from the Centre or other agencies be made available. This is essential for the promotion and maintenance of the requisite standards in the future post-graduate institutions. Among the principles and criteria for judging the fitness of an institution to undertake post-graduate training, special emphasis should be given to the following:

1. A staff with a high degree of competence as attested by formal training and degree of professional respect.
2. Adequate resources and facilities (laboratories, equipment, land, livestock, etc.)
3. Staff members distinguished in research.

Agricultural Universities

The First Indo-American Team reported widespread interest in the establishment of rural or agricultural universities. This interest apparently stemmed from the earlier report of the University Education Commission appointed under the chairmanship of Dr. S. Radhakrishnan.

The Second Indo-American Team is impressed by the fact that this interest has progressed rapidly and at least one State has passed enabling legislation and established an agricultural university. Several other States have also started planning of institutions to be ultimately developed into agricultural universities.

In order that these Universities may be of maximum benefit to agriculture and related industries, it is necessary that goals to be achieved should form the basis for planning. A clear concept of what such a university is to accomplish must be enunciated in order that proper planning may become possible and the public may have a clear understanding of what to expect of such a university. This Team has noted a widespread desire to build up such universities even when a full understanding of the basic requirements and objectives is lacking. In the implementation of this far-reaching change in the education pattern of the country, no amount of caution at the initial stages is to be considered excessive. The impact of such universities on rural life and vocations will be so great that all the care bestowed on their planning will benefit the whole agricultural education system. Only such institutions should be allowed to be developed into Agricultural Universities as will work towards that concept which the Radhakrishnan Commission envisaged and which is so well exemplified in the Land-Grant University concept. The Team would in fact go further and say that no financial aid should be extended to any State for the establishment of an Agricultural University unless the prerequisites are fully understood and satisfied as determined by a competent body working under the aegis of the I.C.A.E. This body should examine such questions and regulate the growth and development of these institutions.

The Second Indo-American Team strongly supports the recommendation of the First Indo-American Team that at least one agricultural university be established in each State. It also recommends that this should be accomplished with as much dispatch as possible.

Goals

The Agricultural University should develop a programme that would ultimately make the maximum contribution to the effort to increase the quantity and quality of agricultural production and improve the economic status of the cultivator. This would be accomplished through teaching, research and extension.

Graduates of these universities would provide leadership in all phases of agricultural production, marketing, processing and distribution. They would become teachers of agriculture in all agricultural institutes, from the Manjri type schools to agricultural colleges and universities. Ultimately, research staffs would be recruited from among the agricultural university graduates.

Extension services should look to agricultural graduates for filling all posts where technical agricultural information is to be disseminated. Particularly should agricultural university graduates (perhaps after additional training) man the posts of extension subject-matter specialists attached to research sections of the university.

It is expected that the agricultural university will become the dominant agricultural education institution of the State, and that some plan will be evolved whereby existing agricultural colleges, veterinary colleges, home science colleges, as well as State experiment stations will be integrated with the university in such a manner that one agricultural education programme for the entire State will be developed under the general direction and administration of the agricultural university.

We assume that the agricultural university would in large measure be a State supported institution, and as such would be, in the final analysis, responsible to the legally constituted State Government.

This Team supports the recommendation that each agricultural university be constituted as a fully autonomous institution with definite financial provisions incorporated in the enabling legislation.

It is assumed that a beginning for an agricultural university may be made by locating a college of agriculture, a veterinary and/or animal husbandry college on the same campus. Even at the beginning these should be integrated so that the courses in basic sciences and the cultural courses required by two or more of the colleges are taught in a common curriculum to avoid duplication of facilities and staff. A central library should serve the entire student body and staff. A college of home science should be added as soon as possible, and a college of Applied Science and Arts should evolve from the nucleus of the central curriculum in the science and arts mentioned above.

All general courses in chemistry, physics, mathematics, zoology, botany, history, geography, languages, sociology, economics and other subjects should be taught in the college of applied science and arts. This college should develop to degree-granting status, but emphasis should be placed on the "applied" aspects to avoid duplication of the typical arts and science colleges. Development in the future should result in the addition of a College of Technology or Engineering.

Regardless of the capabilities of the agricultural university graduates they will have a real impact on Indian agriculture only when their knowledge is transmitted to the cultivator and put into practice. Extension systems are expected to accomplish this, but the responsibility of the agricultural graduates cannot be discharged simply by passing on information to the extension staff. In whatever capacity they are employed, they must have a real feeling of the urgency of the agricultural problem in India. They must be dedicated to their profession to help achieve goals set for agriculture.

The goals mentioned above cannot be accomplished through directions from an office or a laboratory desk. All education will fall short of the desired objective if those who are educated do not get into the field and work directly with those they hope to influence.

Administrative Organization

The top administrative body should be a Board of Supervisors so selected as to be representative of the various agricultural interests of the State. It may include some government officers as ex-officio members. Appointment should be for a period of not less than five years with the exception that original appointments should be for varying periods so that the term of office of not more than three members would expire within one year.

This Board would have responsibilities as delegated to it in the legislation establishing the University. This Team considers that the Board's most important functions would be as follows:

1. Select and appoint a Chief Administrator of the University.
2. Establish broad policies and develop an organizational pattern within which the Chief Administrator would govern the University.
3. Review at least once a month the financial transactions consummated, and approve proposed expenditures for a month in advance.
4. Review, monthly, actions contemplated and taken that would affect the internal operation of the University. Pass on projected action of appropriate nature and take final action on all appointment recommendations submitted to it by the Chief Administrative Officer.

This Board also would have to shoulder considerable responsibility during the building of the University not only in planning the physical plant but also in securing the needed land for teaching and research, without which an agricultural university cannot function properly.

Considerable sums of money will be required to initiate an agricultural university. The Board would be of great help in securing the needed funds from the State or Centre for this purpose. Annual budgets would need to be prepared with the help of the Board for presentation in the State legislature.

Duties of University Administrators

Chief Administrator: The Chief Administrator of the University would, in the final analysis, be responsible to the Board of Supervisors for all functions assigned to the University. He would make all day-to-day decisions affecting the university generally, and also, if necessary, indicate (subject to the Board's approval) policies to be recommended to the Board which might have important long time implications.

The Chief Administrator would decide as to what matters should go before the Board. He would approve all recommendations for staff appointments, and transmit them to the Board. He would be responsible for recruiting and recommending appointments of Heads of academic divisions or other administrative posts next below his own.

Immediately below the Chief Administrator should be a number of administrators, one for each of the academic divisions, one for finance, and perhaps one for physical plant. In addition to the responsibility of administering a division, these individuals should be constituted as an advisory council to the Chief Administrator.

Next in order would be one administrative officer for each academic department who would be responsible to the head of his division.

Division Heads: A Head of a Division would administer the financial, teaching, research and extension activities of departments in his division.

He should accomplish administrative supervision through heads of departments.

Department Heads: A department head would recommend personnel for appointment in all established posts in his department, and have direct responsibility for teaching, research and extension activities of the personnel in his department. Each teacher should devote a specified portion of his time to teaching and research. It is possible that a few individuals will be full-time teachers and a few full-time research workers, but on the whole, integration should be so complete that there is a composite staff to do the complete job with no rigid demarcation between the teaching and research duties.

Agricultural extension is meant to convey research findings to the cultivator and to encourage their use for improving production. To accomplish this, the extension subject-matter specialist should be responsible to the head of the department for technical information. Wherever possible he should function in close proximity to the research staff so that he can keep abreast of current knowledge and also keep the research staff in touch with the needs of the cultivator.

All appointments should be made on the basis of formal training as well as demonstrated ability in the field of specialization without undue emphasis on seniority.

Teaching:

Good teaching is much more than monotonous repetition of notes accumulated through the years and oriented to help the student to pass a stereotyped final examination.

Good teaching results only when the subject taught is kept abreast of the very latest research information, published or unpublished. The subject should be presented as a living dynamic thing and not as an accumulation of dusty sterile facts and opinions.

Good teaching in agriculture, as in all applied science, will usually result only when the teacher is engaged in independent research of his own.

The curricula should be developed by the University staff. Although there should be some uniformity of curricula among colleges of the same kind within a State, as well as among universities in different States, it is hoped that each curriculum will be flexible. All students within a given discipline should not be required to take the same courses of study. Ample opportunity should be available for students within a college to specialize by electing courses not required of all students. Students in one college should be allowed to register for courses in another college.

Specialization in restricted areas within each subject-matter field is important. However, it must be recognized that in some respects the present college curricula are over-specialized or restricted within broad areas.

Even though more opportunity for specialization in agriculture must be provided, agronomy and horticultural majors need training in soils and fertilizers. Likewise, agronomists must have some courses in livestock production; and the agronomists and soils graduates must have an appreciation of the engineering aspects of soils and water conservation. Graduates in animal husbandry must appreciate the relationship of soils and crops to livestock. For this reason, courses in soils and agronomy should be in the animal husbandry curriculum.

University graduates can render greatest service only when they have a broad understanding of all phases of agriculture. Therefore, courses in economics, agricultural economics, farm management, and rural sociology should be strengthened in practically all curricula.

Special courses in extension methods must be available for students who propose to enter the Extension service upon graduation.

This brief discussion should not be taken as a complete course outline. It is designed to focus attention on the need for a curriculum to train specialists. Yet there is a need in the curriculum for certain courses that will give the specialist a clear concept of the relationship of his specialty to the whole of Indian agriculture.

The educational process also should result in the development of a well-rounded educated individual. This can be accomplished by including social sciences and humanities in the curricula.

We feel that the present system of external examinations would be entirely inappropriate in the agricultural university as visualized. The proficiency of a student should be determined by evaluating his response to lectures and practicals, periodic examinations, and a final examination. All this evaluation should be done by the person teaching the class, and grades should be determined and reported by him.

Student Body

It is hoped that the major portion of the student body will be sons and daughters of cultivators although others should not be excluded.

Though few of the graduates of the agricultural university will return to cultivate the land, it is essential that the students and the faculty develop a feeling of fraternity with the producer in order that the teaching, research and extension activities be made serviceable to the people who live upon and cultivate the land.

Research

Attention has been directed to the fact that a good teacher must be one who is engaged in independent research. It is not implied that research should be undertaken for the sole purpose of supporting the teaching programme. Rather, it is thought that research of significance to agriculture will be part of the responsibility of the technical personnel of the university. The benefits to teaching will be in large measure of an incidental nature.

Reference to the Research portion of this report will reveal in more detail the relationship of research work at the university to the overall programme of research in the State and the Nation.

Agricultural Education System -- Discussion

In order that India may develop an effective agricultural educational programme, it will be necessary that all institutions in which agriculture is a part of the curriculum be fitted into an educational pattern with definite objectives for each type of institution included. The Team visualizes an agricultural educational pattern based on:

1. Manjri type schools to train cultivators and village leaders.
2. Multipurpose high schools to impart a background of scientific agriculture to boys, who may later pursue higher education at colleges and universities.
3. Colleges and Universities to train technical personnel to become teachers, research workers, extension leaders (B.D.Os., subject-matter specialists, etc.), and assume leadership in agriculture.

The first Joint Indo-American Team endorsed the proposal that one vocational agricultural school of the Manjri type be established in each district. The objectives and limitations of training offered in these schools should be fully outlined so that prospective students may understand what they will be qualified to do on completion of the course.

Students who enter such schools before matriculation should expect to return to the land where they will form a nucleus of trained progressive farmers who will do a better job of farming than would be possible without this training. They may also advance to positions of leadership in their villages or districts and thus raise the level of agriculture in their community and State, and finally in the nation.

This should not be interpreted to mean that students passing out of Manjri type schools should be debarred from all employment, but it does mean that no attempt should be made to qualify these boys for government employment beyond jobs at the village level.

Training of this type should not however permanently prohibit students from taking additional training and qualifying for advanced positions. Indeed, as suggested by the First Team, students of unusual ability should be encouraged and assisted to continue their education through college or university.

It is also possible that matriculates who complete the course of study prescribed at the Manjri type vocational schools can, with some additional training, qualify as VLWs.

High Schools

Students passing out of Multipurpose High Schools may be expected either to choose any one of the activities connected with agriculture or to take higher education in agriculture. The agricultural background that the rural boys have will be strengthened by the education in scientific agriculture as imparted in these High Schools. Those who have ability and aptitude should be encouraged and assisted to continue their education at college or university level.

Youth organizations and project assignments should form an integral part of the training in such high schools. All course-work as well as other activities of the high schools should be such that the student is kept close to the problem of the cultivator and has a real appreciation of the ways in which he may contribute to the advancement of agriculture.

Teaching of agriculture at the high school level must reach the farm home. Hence it is desirable that the students should have access to a plot of land which may be used as a school project. This land area should be of sufficient size to allow activities common to farming of the area.

The success of such schools to some extent will depend on the syllabus, but will depend more largely on the leadership and inspiration furnished by the teacher.

The goal should be that all agricultural teachers in multipurpose high schools have a B.Sc. degree in agriculture. It may not be possible to achieve this requirement in the immediate future. In the meantime, in-service training and field supervision should be used as a means of upgrading the teaching programme.

Under-Graduate Colleges

Education at the college or university level must, like other parts of agricultural education, be oriented to meet the needs of the farming community. The opportunities for service resulting from completion of a course in such an institution are much greater and more varied than those resulting from training at below college level.

College or agricultural university graduates at the B.Sc. level will become the foundation on which an improved agricultural programme must be built. The graduates will be qualified for any and all activities available to graduates of vocational schools and multipurpose high schools. Eventually, B.Sc.(Ag.) graduates should be posted as VLWs. B.Sc.(Ag) graduates are needed now in large numbers to man the many government posts requiring this type of agricultural training. Indeed, they could well be used in many teaching and government posts now filled by graduates of art and science colleges. It should be a requirement that all agriculture teachers in Manjri type schools and Multipurpose high schools have a B.Sc. in agriculture. B.Sc. graduates are also required to man many of the junior posts in colleges and to assist senior scientists in their research programmes.

The success of the agricultural extension programme will, in large part, depend on the use made of agricultural graduates. They must fill all extension posts above the VLW level requiring knowledge of agriculture. It is from the ranks of B.Sc.(Ag) that post-graduate students are recruited. Talented science graduates, however, should also be permitted to enter post-graduate institutions in agriculture for higher training in selected subjects.

In this connection, the Team reiterates the warning that quantity is less important than quality, and urges that all colleges and universities offering a B.Sc. in agriculture be required to meet minimum specifications regarding entrance and graduation requirements. We feel that it will be much more useful to expand and strengthen the existing institutions than to establish additional colleges except to meet the needs of regions which are inadequately served at present.

Post-Graduate Colleges

The development of a post-graduate programme leading to the M.Sc. or Ph.D. degree should be approached with a clear concept of what such a programme requires. Staff facilities that are ideal for undergraduate study may be (and in many cases are) totally inadequate for post-graduate study.

It is from this group of M.Sc. and Ph.D. degree holders that agricultural colleges and universities will secure most of their teachers, research workers and administrators. Many of the administrative officers and certainly all of the agricultural subject matter specialists in the Extension service should hold M.Sc. or Ph.D. degrees from recognized institutions. Likewise, senior scientists in all research institutes should have had this advanced training. The urgent need for qualified personnel emphasises that colleges or universities must be closely scrutinized before they are allowed to undertake post-graduate training. The Team found that most colleges now offering B.Sc. (Ag) degrees are striving to initiate a post-graduate programme. This is true even of colleges which are poorly equipped (facility and staff wise) to discharge the under-graduate teaching task presently assigned to them.

CHAPTER IIIR E S E A R C HResearch Organizations and Agencies

Agencies vested with the responsibility of conducting agricultural research vary considerably with regard to their organizational pattern. More significant than the diversity of patterns is the dispersion of responsibility among numerous Central and State Government agencies as well as autonomous bodies set up under the Central Government. No one organization or body has the overall responsibility at present for an assessment of India's agricultural problems in their entirety with respect to research coverage and needs.

An understanding of the prevalent diversity of research responsibilities is provided by the following list of organizations.

1. Central (National) Research Institutes under the Ministry of Food and Agriculture with broad coverage of subject matter, such as I.A.R.I., I.V.R.I., and J.D.R.I.
2. Central Research Institutes under the Ministry of Food and Agriculture with emphasis on certain commodities such as Rice, Potato and Sugarcane and Research centres such as in Soil Conservation.
3. Central Research Institutes under Commodity Committees with administrative control vested with the Ministry of Food and Agriculture, such as Coconut, Arecanut, Tobacco, Lac and Jute.
4. Central Research Institutes under the Ministry of Commerce and Industry on certain commodities such as Coffee, Tea and Rubber.
5. Central (National) Research Laboratories, such as the Central Food Technological Research Institute under the Council of Scientific and Industrial Research with responsibility for research on utilization of farm products.

6. Central Research Organization like those of the Atomic Energy Commission which has a biological wing dealing with irradiation of crops for induction of mutants and fundamental genetic studies using irradiation as a research tool.
7. Central Technological Research Laboratories as for Cotton under the Indian Central Cotton Committee.
8. Central Statistical Research Institute under the I.C.A.R.
9. Regional cross-commodity research centres (PIRRCOM) established and operated jointly by the Indian Council of Agricultural Research, Indian Central Cotton Committee, Indian Central Oilseeds Committee, and State Governments in the region.
10. Regional Research Centres dealing with fruits, vegetables, etc., operated cooperatively by I.C.A.R. and State Governments.
11. Centres of research on a national or regional basis scheduled for establishment during the Third Five Year Plan period mainly with I.C.A.R. or Central funds, such as in river valley project areas, regional salinity laboratories, irrigation research laboratory, forage and grassland research centres, plant introduction centres, a tuber crops research station, a national herbarium and a plant virus research institute.
12. Centres of research on coordinated bases such as on wheat rust, hybrid maize, etc., with I.C.A.R. guidance.
13. Substations of the Central Research Institutes in the States.
14. Research Centres and experiment stations maintained by the States.
15. Research stations or schemes supported jointly by I.C.A.R. or Commodity Committees with the State Governments.

Central Research Institutes

Some of the Central Research Institutes have responsibilities for specific fields of research whereas the majority of them conduct research only on one commodity. Responsibilities of a general type institute frequently cut across those of other institutes. The I.A.R.I. for instance, with its broad spectrum of agricultural research encompassing the fields of agronomy, botany, entomology, mycology and plant pathology, soil science and agricultural chemistry, agricultural engineering, agricultural economics and agricultural statistics, conducts fundamental research on many subjects covered by the Commodity Committee research centres. As pointed out by the First Team, the I.A.R.I. has no recognized position of leadership or responsibility in relation to the other Central Research Institutes which are restricted in their scope of research to specific crops. Further, neither the I.A.R.I. nor the I.V.R.I. are in a position to function effectively as leaders in their respective fields of research, or in a coordinating capacity for cooperative State Centre programmes of regional or national scope.

Many of the Central Research Institutes have branch stations located in specific crop areas. The I.A.R.I. for instance, has sub-stations at some nine locations. In most cases, sub-stations are established as units independent of State or other Central Stations.

The research staff of the Central Research Institutes visited by the Team were found to be of high calibre. The adequacy of facilities and equipment varied among institutes and among sections within institutes. In general, however, facilities and equipment at the Central Institutes were more adequate than those available at State Agricultural Research Stations.

Indian Council of Agricultural Research

Since its inception in 1929, the I.C.A.R. has been the agency to promote, guide and coordinate agriculture, animal husbandry and veterinary research throughout India. It deals with research on food crops, horticulture, medicinal plants, animal husbandry, dairying and veterinary problems. The Council's funds are obtained from Central Revenue as well as through a cess levied on the export of a number of agricultural commodities. Its annual income from the cess now ranges from Rs.40 to Rs.50 lakhs, and the expenditure from Rs.42 to Rs.65 lakhs.

per annum. During 1959-60, over 1000 research schemes were financed by the I.C.A.R. The actual operation of the schemes is left to State Agriculture Departments, Central Research Institutes and private colleges and institutes.

Commodity Committees

Central Commodity Committees have been established for the following crops:

1. Cotton
2. Lac
3. Jute
4. Sugarcane
5. Coconut
6. Tobacco
7. Oilseeds
8. Arecanut

Revenues for the cotton, lac, coconut and oilseed Committees accrue from special cesses on the respective products on the basis of processed units. Finance for the other four Committees is provided directly by the Ministry of Food and Agriculture. Some of these Committees, viz., Jute, Sugarcane, Tobacco, Lac, Coconut and Arecanut have organized research stations. In general, however, research on a particular commodity is conducted through research schemes drawn up at State research stations and sanctioned by the Commodity Committees. For the most part, the schemes are of small size and their duration is limited to five years in the first instance.

Contributions from the Commodity Committees for sanctioned research schemes, in general, require matching funds from the respective States. The ratio of matching funds required varies somewhat in accordance with the reserve funds on hand. In this context it may be mentioned that the Indian Central Oilseeds Committee has recently adopted a more liberal financial pattern for research schemes on oilseed crops in the interest of stimulating research on these crops.

The First Team recommended that a certain portion of the revenues of the Commodity Committees be utilized for the initiation of cross-commodity research. The Indian Central Oilseeds Committee, the Indian Central Cotton Committee and the Indian Council of Agricultural Research together have since launched a programme for cross-commodity research through the

initiation of PIRRCOM Centres (Project for Intensification of Regional Research on Cotton, Oilseeds and Millets). These centres are to conduct research on basic problems relative to the region as a whole on cotton, oilseeds and millets, and to undertake the study of those problems which cannot be taken up at existing research stations. These centres also provide a mechanism to coordinate the work of the different State stations in the regions they serve. The Research staffs of these centres will consist of scientists specialized in different aspects of the problems to be studied, and will work as a team. The research programme will be guided by a Coordinating Committee which includes administrative and technical representatives from the I.C.A.R., appropriate Commodity Committees and the States in the region. Subject-matter sub-committees composed of scientists at the PIRRCOM Centre and the States concerned will meet half yearly to review the progress of research in the region and suggest to the Coordinating Committee items of work to be taken up at each research station in the States and the PIRRCOM Centres.

Ministry of Food and Agriculture -- Department of Agriculture

Agricultural research is also conducted under the Department of Agriculture of the Ministry of Food and Agriculture, Government of India, at some centres other than its Central Research Institutes. Soil Conservation research, for instance, is conducted under the Soil Conservation Board of this Ministry which functions independently of I.C.A.R. Research in different aspects of forestry, including plant diseases and entomology, is conducted through the Forest Research Institute under this Ministry, also independently of I.C.A.R.

State Departments and Institutions

The State Governments, under the Constitution, have a major responsibility for agricultural research. The State agricultural research organizations vary in size and effectiveness. The reorganization of States has created organizational problems some of which have yet to be solved. The resources of the States are generally limited. Central assistance has consisted largely of financing short-range schemes or projects sanctioned by the I.C.A.R. or the Commodity Committees. All schemes financed by the I.C.A.R., and most schemes financed by Commodity Committees, require matching funds from the States. Research accomplishments in the short range research schemes or projects vary greatly, depending upon the availability of competent

personnel and, still more important, upon the quality of guidance and supervision available in the respective States. Regardless of the progress made, the schemes have not been effective in building strong State agricultural programmes of a permanent nature.

Other Institutions

Agricultural research or work in related sciences is receiving attention in India in certain Universities and laboratories or agencies endowed by private benefaction. The Indian Institute of Science, Bangalore, is an example of an endowed research institute. Some universities, similarly endowed, such as the Anand Agriculture Institute, also carry out agricultural research. The I.C.A.R. has been rendering assistance to such universities and private institutions through research grants without the requirement of matching funds, which is required in the case of grants to States.

There are some research institutions of the Government of India outside the Ministry of Food and Agriculture conducting research in agriculture or related fields. The research centres of the Rubber Board, Silk Board, Coffee Board and Tea Board are examples of research organizations functioning under the Ministry of Commerce and Industry. The Council of Scientific and Industrial Research similarly has research centres, such as the Central Food Technological Research Institute at Mysore, the National Botanical Gardens at Lucknow, the Drug Institute, and research centres on essential oil yielding plants. The National Botanical Survey and Zoological Survey, together with the herbaria established under their auspices, also undertake work of interest to agriculture, such as the exploratory work by the National Botanical Survey of India which is of special interest to agricultural workers in the utilization in crop breeding projects of wild relatives of cultivated crops. Research on irrigation is conducted by the Ministry of Irrigation and Power. The Atomic Energy Commission, through its Biological Wing, conducts research on irradiation and induction of mutants and related fundamental genetics research.

Summary of First Team Report

The recommendations of the First Team related largely to problems concerned with financial support of research programmes, organization at Centre and State levels, and coordination of research among the various agencies.

Financial Support

Need for expansion of research was recognized not only for strengthening the research schemes in operation, but also for initiating research in neglected fields. Special allocations of Central funds to the States were recommended on the basis of long-term continuing grants to be used at the discretion of the States for research on significant agricultural problems. The need for continued support of agricultural research by the States and for expansion of State facilities to be used by both the State and the Centre personnel was stressed. Within the current programme, financial assistance for work on cross-commodity problems was recommended from a fund to be established under the I.C.A.R. by percentage allocation from the annual income of the various Commodity Committees.

Organization

The establishment of I.C.A.R. as the technical arm of the Ministry of Food and Agriculture for the coordination of all research and related activities supported by Central funds was recommended. Central Research Institutes under the control of I.C.A.R. were recommended to become the executive arm of the Council. It was recommended that the Commodity Committees should also be under I.C.A.R. administration. Both the I.C.A.R. and the Commodity Committees should use their resources to supply trained personnel and operating funds to conduct schemes of regional or national scope instead of merely making monetary grants for research schemes.

The Team recommended that a technical staff of high competence, including individuals responsible for each major field, should be appointed in the I.C.A.R. This staff together with appropriate officers would constitute a Board responsible for continuing analysis of the over-all research needs of India. Individual members would have responsibility for constant review of research in their speciality and for recommendations to the Centre and to the States.

Coordinators or leaders were recommended for each major project or field of work. The coordinator, preferably a senior active research scientist of a Central or State station, would help to bring about coordination of research, through stimulating inter-change of working plans and ideas among the scientists, in the planning of regional experiments on a uniform basis and in the preparing of joint reports.

In the interest of saving time of technical officers, it was recommended that programme planning should be done on a biennial rather than annual basis. Substantial revision in the make up and function of Commodity Committees was recommended to reduce overhead costs.

To ensure coordination of education and research at the State level, it was recommended that responsibility for these fields be assigned to a Joint Director, who should preferably be the Principal or Dean of the leading Agricultural College in the State. The responsibility for translating research results into practical recommendations and for transmitting the recommendations to cultivators should be largely assumed by the State.

The need for coordination of Centre and State research projects was stressed. Recommendations included joint planning of and participation in all regional research, provision by States of laboratory and field facilities for joint regional research and contribution from the Centre of qualified technical personnel.

Current Situation

The Second Joint Indo-American Team was pleased to note the acceptance, in principle, of many of the recommendations made by the First Team. At the numerous locations visited, a genuine desire was noted for devising means by which implementation of some of the recommendations could be effected. Though little progress can be documented on most of the recommendations, the Team sensed an increasing awareness, in general, for the need to gear the agricultural research programme to India's major problem of greater agricultural production.

In their review of the current status of research, the first Team came to the conclusion that the total research programme then under way was inadequate to meet the needs and demands for improved agricultural products and practices on Indian farms. Moreover, the agricultural research output was inadequate to meet the needs for new information required by the growing programme of the National Extension Service of the Community Projects Administration. Attention was directed to the inadvisability of permitting inadequate and unfounded information to pass through extension channels. Incomplete coverage, temporary nature of the current research, and lack of coordination are the result of the inadequate overall programme.

After a lapse of over four years, the position in some respects, at least, remains unchanged. In particular, an additional appropriation to be increased by annual increments, as suggested by the First Team, has not been made. The research workers of most I.C.A.R. schemes still hold temporary posts. Coordination of work under some research schemes, such as with hybrid maize, has been effected through project Coordinators, while for cross-commodity research PIRRCOM centres have been set up. However, the Central Research Institutes have not been organizationally linked with the I.C.A.R. and, as a consequence, are not serving as the effective executive arm of the Council as envisaged by the First Team. Most of the Commodity Committees are under the control of the Vice President of I.C.A.R. in his capacity as Additional Secretary to Ministry of Food and Agriculture; however, the Sugarcane Committee is outside his purview and therefore even this degree of coordination does not here obtain. Effective coordination of the Commodity Committee research with that of the central research institutes has not been established.

The development in I.C.A.R. of a well rounded staff of specialists in the major problem fields as recommended by the First Team has not been accomplished. The Team was informed, however, that this recommendation has been accepted in principle and will be implemented when funds permit.

The Team was pleased to note that the value of appointing project coordinators is recognized. Highly beneficial results are apparent, notably in the hybrid maize programme. In many fields, however, the Team noted inadequate coordination among research workers. Appointment of additional project coordinators, responsible to the staff of specialists would contribute materially to coordination.

Research schemes financed by the I.C.A.R., though helpful in promoting agricultural research, are of such nature as to render them largely ineffective for solving major problems. State schemes sanctioned by the I.C.A.R. require matching grants from States. This feature encourages State Finance Departments to require State Departments of Agriculture to submit all research schemes to the I.C.A.R. This not only entails considerable administrative work but also places the State Directors of Agriculture in an awkward position in building a strong State research programme.

Research schemes supported by the I.C.A.R. are, in general, of small size. During 1959-60 more than a thousand schemes were financed by the I.C.A.R. With an annual expenditure of approximately Rs.50 lakhs; the average annual contribution per scheme is roughly Rs.5,000. Considering the short nature of these schemes (from 3 to 5 years), the average total allocation per scheme is very low. Even these averages are somewhat misleading. Allocations to a few schemes range upwards to lakh rupees. The majority of schemes, therefore, are considerably smaller than the average. The small size and discontinuity of subject matter make the schemes unsuitable for conduct of large scale regional or national trials of newly developed practices or materials.

In several States, it was brought to the Team's attention that the temporary basis on which personnel are necessarily employed with these funds renders particularly the small schemes largely ineffective. The schemes, at best, constitute a fragmentary and piecemeal approach to the solution of India's enormous agricultural problems. The attention of the Team was directed to at least one recent case, the hybrid maize programme, where I.C.A.R. sanctioned a large multiple programme. The Team feels that extension of this trend will result in more effective use of I.C.A.R. funds.

In the Commodity Committees the basis of sanctioning schemes has undergone little change. The recommendation of the First Team that, in the interest of reducing overhead costs, research programmes should be formulated on a biennial basis was not implemented because of annual budgetary consideration requirements. The Team was impressed with the coordination of research under each of the respective Commodity Committees. Scientists working on Commodity Committee schemes seem better informed on related research being conducted at other stations than scientists on programmes not associated with Commodity Committees. This observation was interpreted by the Team as an indication of the need for scientists within a subject specialty to confer more regularly on progress and plans. The Commodity Committees provide a mechanism to facilitate such conferences.

Certain progress has been made in regard to the recommendation of the First Team that cross commodity problems be considered in the formulation of research programs. The project for Intensification of Regional Research on Cotton, Oilseeds and Milllets (PIRRCOM) was devised for cross commodity research on these crops. It is a matter of satisfaction that the PIRRCOM centres are, in most cases, located adjacent to State research stations. Unfortunately, however, the centres observed

are developing physical facilities separate from the State facilities. Sharing of laboratories and research equipment thus will not be possible in large part. The Team also observed a lack of understanding among personnel involved concerning the basis for establishment, role and function of PIRRCOM centres.

The First Team's recommendation that Central research institutes should not normally establish separate branch stations but locate their scientists at the State stations to ensure maximum Centre-State coordination of research has not been followed.

The Team was pleased to note the substantial increase in building facilities recently completed or in the process of construction in nearly all States. The increase of the physical plants should be regarded as a desirable prelude to greatly needed strengthening of the State research organizations. In many cases it was noted that progress in obtaining adequate research equipment and acquiring competent research personnel lagged far behind the construction of new buildings. In fact these limitations are so great that, in some of the comparatively backward States, very little effective research is being accomplished. The need for Central financial aid on a more permanent basis than provided by the small, short range I.C.A.R. and Commodity Committee research schemes is apparent. Greater allocation of recurring funds by States to their agricultural research programmes is also needed.

The posts of Director of Agriculture continue to be held in many States by persons who do not have a technical background of research, training and experience. Joint Directors of Research and Education, as recommended by the First Team, have not been appointed in most States. The problem of relaying the results of experimentation to extension workers and the reciprocal function of keeping scientists informed of practical problems requiring research attention has not been satisfactorily solved.

The failure to utilize, with maximum effectiveness, the time of the limited number of well trained specialists is a matter which must receive serious attention. Numerous scientists with major responsibilities in the conduct of research stated that a good deal of their time was required for administrative duties such as maintaining accounts. The Team was informed that annual confidential reports are sometimes based more on the administrative efficiency of the officers concerned than on their proficiency as research scientists. This problem was examined by a Central Committee, and it is hoped that the recommendations of this Committee will be implemented.

Retirement of scientists and scientific leaders at an early age also entails a wastage of trained and experienced personnel. Means should be devised to utilize the time of productive personnel during their senior years.

Basic Principles of Agricultural Research

1. All agricultural research should be geared to India's major problem of increased agricultural production from both short and long-range aspects. An integral part of this principle is the need for increasing the efficiency of agricultural production.
2. Problems interfering with maximum food production that can be solved through research must be properly identified and given priorities for investigation and solution.
3. Before launching a major research programme on a particular problem, provision should be made for studying all facets of the problem as it exists at the cultivator's level. Research on various aspects of the major problem or subsidiary problems may be assigned to scientists in various disciplines and organizations; however, the research efforts must be so planned that all segments of the major problem are considered and that all research efforts are coordinated.
4. All agricultural research must be coordinated and integrated to provide maximum progress towards solution of problems and elimination of duplication. Needless repetition of research already conducted in India or other countries should be avoided.
5. Agricultural research should be designed and conducted in such a manner that answers to the cultivators' problems are forthcoming. Emphasis should be given to applied research that will permit putting into practice known basic principles. Basic research should, for the present, be restricted to those problems where applied research is hampered by inadequate knowledge of fundamentals.
6. Research results must be of unquestionable accuracy. All critical phases in the conduct of a research experiment should be under the direct observation of a research specialist adequately trained to understand the objectives of the experiment and to recognize bias introduced through faulty techniques. The tendency of research officers to delegate the collection of field data and observations to incompetent subordinate staff cannot be condoned.

7. Research specialists should be utilized to maximum advantage. They should devote major attention to research and not be handicapped with administrative duties and details. Personnel evaluation and promotion should largely be based on their research competence and productivity.
8. Provision should be made for an adequate training program to provide increasing numbers of research personnel with high technical competence. The education and research components of the agricultural college comprise an inseparable team in attaining this objective. Training of research scientists can be accomplished best by scientists participating jointly in education and research.
9. The total agricultural research programme in India is inadequate to cope with the many and varied problems relating to increasing production. Additional specialists and facilities are needed. This need will exist even after the current research programme is raised to a high state of effectiveness.
10. Over-centralization of agricultural research should be avoided. Effective decentralization can best be achieved by strengthening the State research programmes through expanded Central and State assistance.

Identification of Problems

The problems that should be of major concern to agricultural research agencies are the impediments encountered by the cultivator in attaining maximum production of food, feed and fibre, and in increasing efficiency of production. Some of the restrictions in production are of immediate concern, such as losses incurred through insects, diseases, or inadequate fertilizers, whereas others are of long-range consequence, such as gradual loss of soils and land through erosion or water logging. In either case, the problem must be identified and properly diagnosed at the level at which it occurs.

The proper identification of the cultivator's problems necessitates continuous surveillance of production methods by personnel competent to diagnose the causative factors basic to the problem. Extension personnel, who work closely with the

cultivator in encouraging the adoption of improved practices, are in an excellent position to recognize the problems for which solutions have not been found and which require additional research. Ideally, therefore, the extension man should have adequate research training for diagnosis of problems. Unfortunately this is seldom possible; nevertheless, it should remain as an objective to strive for.

The most practical alternative is to provide liaison between extension personnel and research specialists at the College or Institute level. Close association will permit viewing of the problem through the eyes of the research specialist and application of his knowledge and skill in analysing the problem according to the causative factors. Research specialists, extension staff and cultivators constitute a team which ideally perpetuate a cycle of information. Research findings transposed into recommendations should pass from research centres through extension ~~extension~~ workers to the cultivators. Information on unsolved problems should flow back from the cultivators through extension workers to research specialists.

In the interests of building a strong national research programme, needs for research at the local level must become known to top level administration. The policy-making bodies can effectively function only when properly informed as to the needs of the cultivators and their relative urgency. Provision should be made whereby information on research needs funnels upward and, after appropriate analysis and consolidation, forms a basis for identifying the major problems in maximizing food production, determining their priority, and strengthening appropriate segments of the research programmes. The information process must be a continuing one. Priorities should frequently be reassessed in the light of developments at the cultivator's level. Flexibility will thereby be provided to cope with new problems as they arise and with needed change in emphasis.

Building a More Effective Research Programme

The agricultural research programme in India is of inadequate magnitude and scope to find solutions to the many agricultural problems facing the country. Several studies have pointed out that agricultural production in India must be greatly increased and in a short time. Time is, therefore, of the essence. Unless the agricultural research programme is appreciably strengthened within the Third Five Year Plan, a major crisis in food production may be faced.

Agricultural Research Policy Council

Presently there is no high level body of technical officers with agricultural background to determine the overall policy of agricultural research in India. There is need for an Agricultural Research Policy Council to perform this function. Such a Council should be convened several times yearly to provide a continuing appraisal of the situation in agricultural production and to ensure that the research programme is geared to meet the existing problems.

Several distinct responsibilities should be assigned to this Council. The major factors that prevent Indian agriculture from attaining maximum production should be identified and assessed as to research needs. The problems should be aligned as to priority of undertaking. Finally, means should be determined to implement a research programme that will give reasonable promise of solving the problems.

Implementing an expanded research programme will necessitate an accurate assessment of the current programme and a knowledge of research capabilities of the various Central and State agencies. Clear cut responsibilities for the solution of the problems should be assigned. In many cases it is necessary to sub-divide the major problems and assign the various segments to appropriate research organizations.

Agricultural Research

Within the organization of the agricultural research programme in India, the Agricultural Research Policy Council can best function by serving as a Standing Advisory Committee to the Governing Body of the Indian Council of Agricultural Research. This Council must supplant the present Board of Research. It should be comprised of high-level agricultural technical officers, representing a wide coverage of India's agricultural research programme. It should be presided over by the Minister for Agriculture or, in his absence by the Deputy Minister for Agriculture. The Vice-President of the Indian Council of Agricultural Research should function as the Executive President of the Council.

A suggested membership is as follows:

1. Agricultural Commissioner.
2. Additional Agricultural Commissioner.
3. Secretary, Indian Central Oilseeds Committee.
4. Secretary, Indian Central Cotton Committee.

5. Secretary, Indian Central Coconut Committee.
6. Secretary, Indian Central Sugarcane Committee.
7. Secretary, Indian Central Tobacco Committee.
8. Plant Protection Adviser.
9. Statistical Adviser, I.C...R.
10. Director, Indian Agricultural Research Institute.
11. Inspector General of Forests.
12. Director, Central Rice Research Institute.
13. Chief of Horticulture and Plantation Crops, ICAR.
14. Animal Husbandry Commissioner.
15. Director, Indian Veterinary Research Institute.
16. Director, National Dairy Research Institute.
17. Chief of Agricultural Education, ICAR
18. Extension Commissioner.
19. Irrigation Adviser to the Government.
20. Senior Director of Soil Conservation.
21. Chief of Agricultural Engineering.
22. Economics and Statistics Adviser to the Government of India.
23. Agricultural Marketing Adviser.
24. Six eminent scientists in agriculture and/or administrators with experience in agriculture, either in service or retired, may also be nominated.

It is to be emphasized that the Council should not be burdened with details. Functions such as sanctioning specific research schemes should be assigned to appropriate bodies like the Advisory Board of I.C...R. and the Commodity Committees. Such organizations will, of course, act in accordance with the policies established by the Council and adopted by the Governing Body.

Organization for Effective Agricultural Research

The ideal agricultural research programme has as a requisite a strong coordinated Central programme and strong State programmes. Both the Central and State programmes have distinct roles to fulfill. A central programme is necessary to furnish leadership in the solution of problems of regional and national significance. Furthermore, most major problems can only be solved through basic research to determine the underlying principles involved. The Centre is in an ideal position to establish and maintain institutes and laboratories of adequate size and calibre to undertake such basic research. In this work highly trained specialists and expensive special equipment are frequently required. Location of such specialists and equipment in each of the States would constitute needless duplication of skills, equipment and efforts.

Not all major problems of regional or national significance can be solved at central locations. In many instances, the regional approach must be used. Though such research must be conducted in several areas, Central personnel are best qualified to undertake it. In general, they operate under less pressure, particularly that stimulated by local problems, than do State personnel. Also, they can function most effectively in establishing inter-State coordination on broad problems.

The building of strong State research programmes is equally important to building a strong Central organization. Each State should have adequate personnel and facilities to undertake research on problems largely confined to that State. Further, the State should be strong enough to participate in joint Central/State research projects of regional nature. Joint participation by State and Central personnel requires mutual understanding and respect between personnel of the two agencies. Proper relationship can be attained only through strong State and Centre organizations. Conversely, this relationship seldom materializes when one organization is strong in calibre of personnel and facilities and the other is weak.

The ultimate goal in Indian agricultural research, therefore, should be to have both strong, coordinated Central research programmes and strong State research programmes.

Central Agricultural Research Organization

The I.C.A.R. was established to promote, guide and coordinate agricultural research throughout India. When organized in 1929, it was envisaged largely as a coordinating group. The resolution establishing I.C.A.R. barred maintaining research institutions directly under its control or employing its own staff of experts. Currently, however, the need exists for full integration of the various agricultural research agencies under the I.C.A.R. Enlargement of the scope and functions of the I.C.A.R., therefore, is recommended.

I.C.A.R. can undertake the coordination of a dynamic agricultural research programme only by strengthening its technical staff (specialists posts) in major research fields. As recommended by the First Team, such staff should include specialists responsible for each major problem field.

Only highly competent personnel in the respective subject-matter fields should be selected. Staff specialists should be responsible for constant review of research in their field of specialization, for continued analysis of research needs in their field, and for development of recommendations to the Vice President, I.C. .R. on improvements and modifications necessary to meet deficiencies. The recommendation made by the First Team, which is concurred in by the Second Team, reads:

"The staff should have responsibility for developing and maintaining adequate procedures for coordination of research within their respective fields. They should serve as the principal liaison or contact officials with advisory committees and other organizations concerned with the specific problem areas. They should be individuals with a background of research experience and stature in their respective fields that would assure the recognition and respect of their associates and subordinates in the Centre and State research institutions. They should keep themselves fully informed of the research needs and research progress to ensure maximum effectiveness in providing advice and leadership in their respective fields."

The Team was informed that the recommendation for the establishment of specialist posts has been accepted in principle, but funds do not now permit implementation. It is recommended that high priority be given to the establishment of this staff.

Excepting the Sugarcane, Veterinary, and Dairy Research Institutes, the Central research institutes are under the Vice President, I.C. .R. in his capacity as Additional Secretary, Ministry of Food and Agriculture. This degree of relationship does not permit effective coordination of plans and programmes of the Central Institutes with research schemes sponsored by the I.C. .R. The First Team recommended that Central research institutes constitute the executive arm of the I.C. .R. and should function as the operating wing of the Council. This recommendation has not been implemented. In the interest of consolidating the central agricultural research programme and assuring adequate coordination, it is recommended that all Central research institutes be brought under the full, effective technical and administrative control of the I.C. .R.

In making the above recommendation, this Team does not wish to restrict the delegation of responsibilities to the Institutes. In fact, it commends the general principle of delegating responsibilities to capable subordinates. After seeing the high quality research under way at a number of these Institutes, the Team feels that, in general, the directors should be relied upon to organize and administer an intensive programme of research. Research plans of the Institutes should be reviewed by I.C..R. to determine that they conform to the policies and priorities established by the Agricultural Research Policy Council. Coordination with research at other Central and State agencies also should be effected through the appropriate I.C..R. staff specialists. The direction of the research programme and work assignments to staff members, however, should be left to the Institute Directors.

The Commodity Committees are functioning effectively in stimulating research emphasis on the respective crops under their purview. The Team obtained the impression that research conducted on the crops under the supervision of Commodity Committees was more fully integrated and coordinated than research on other crops. The mechanism provided by the Commodity Committees for convening meetings of scientists working in various fields undoubtedly has been highly beneficial. The Team felt, however, that Commodity Committee research programmes are not adequately coordinated with other agencies. Further, their programmes do not permit flexibility relative to total research needs of the country.

To bring the Commodity Committee programmes into an overall agricultural research coordinating body, it is recommended that all Commodity Committees be brought under the full technical and administrative control of the Indian Council of Agricultural Research. The appropriate I.C..R. staff specialists should assume responsibility for coordination of research conducted or sanctioned by the Commodity Committees with that of the Central Research Institutes. It should be noted that the Secretaries of the Commodity Committees are recommended to be included in the Agricultural Research Policy Council. This Council should be well qualified to evaluate the magnitude of research programmes on each commodity crop as it relates to the overall research needs of the country.

The First Team recommended scrutiny of the Commodity Committees in the interest of reducing overhead costs, particularly with respect to the frequency of meetings. The Team was informed that the First Team's recommendations to reduce the Committee meetings to a biennial basis was considered,

but due to budgetary complications the recommendation could not be implemented. This Team is pleased, however, to learn that several Commodity Committees have reduced the number of their annual meetings to one. Commodity Committees in this category are: Tobacco, Jute, Oilseeds, Coconut, Arcanut and Lac.

Most major food grain crops, particularly rice, wheat and pulses, are not receiving adequate attention in respect of research needs. The Agricultural Research Policy Council should give special attention to research needs of food grain crops. It is recommended that additional funds be appropriated and earmarked for intensification of research on these crops.

The I.C.A.R. resources, presently devoted to short-term research schemes of limited scope, should be devoted principally to projects of national or regional significance and to cross-commodity research. Concurrent with the recommended strengthening of State research programmes, the States should take greater responsibility for research on problems largely of intra-State scope.

As stressed by the First Team, numerous gaps exist in research coverage by the current programmes. Identification of specific needs in neglected fields requires much more time than available to the Second Team. Particular scrutiny should be given by the Agricultural Research Policy Council to deficient fields, especially cross-commodity problems. In this connection, attention is invited to the Report on India's Food Crisis and Steps to Meet It, prepared by the Agricultural Production Team, sponsored by the Ford Foundation, which recommends the establishment of two Centrally financed research institutes — to conduct basic research on national and regional soil and water conservation problems — one located in an irrigated, and the other in a non-irrigated area.

The branch stations of Central research institutes have been established largely as independent stations. The general subject of branch stations is included in a later section. The Second Team recommends that, wherever practicable, all branches and regional stations of Central research institutes and Commodity Committees should be combined and fully integrated with State Stations. It further recommends, in the interest of promoting State-Centre coordination and improving relations between the two agencies, that the Central personnel at branch stations should be placed under administrative control of the States. Their selection, promotion and technical control, however, should be retained by the Central Agency.

Certain activities and responsibilities, presently and logically occurring in Central and State agencies other than agriculture, have a direct bearing on agricultural research. Inadequate liaison among agencies was observed. More effective liaison should be worked out between the I.C.A.R. and the Botanical and Zoological Surveys of India. Similarly, more effective coordination should be brought about between Irrigation and Agriculture Departments, both in the State and Central levels, in order to make irrigation and drainage research more fruitful and to utilize the irrigation potentials to the maximum.

The establishment of the I.C.A.R. project files provides a thorough documentation of current research projects in India.

State Research Organization

The research programme in the States is inadequate to cope with the numerous problems peculiar to the respective areas. Even so, the strength of research programmes varies greatly from State to State. Only through strong State programmes can local problems be given adequate attention and effective State-Centre relationship developed.

The First Team recommended the strengthening of State programmes through annual long-term continuing grants, distributed on the basis of population. It was brought to the notice of this Team that this basis of distribution is not suited to actual research needs. It is felt that cognizance should be given to the differential level of State programmes now prevailing. Moreover, research needs in various regions are of different magnitude. Equitable distribution seems possible only through a judicious study of the needs within each State and allocations on the basis of such findings. This Team recommends, therefore, that the responsibility for determining the needs within each State to build a strong research programme be a function of the Agricultural Research Policy Council. In order to provide the necessary resources required, it is recommended that the Government of India make available to the I.C.A.R. a substantial allotment of funds in the Third Five Year Plan specifically earmarked for strengthening State programmes.

It was brought to the notice of the Team that, in certain States, though funds were available, the present staff is inadequate to build properly and effectively a strong State programme. The status of specialized training in these States

is such that trained scientists are not available to provide the foundation for a strong research programme. It is recommended that in these States, the Centre furnish trained personnel from other States for specified periods to facilitate the building of staff and facilities.

Within each State provision should be made for the coordination of the entire agricultural research programme. Responsibility for such coordination should be assigned to a Joint Director of Agriculture (Research). In the interest of coordination between education and research, it is recommended that the Joint Director be the Principal or Dean of the dominant Government Agricultural College within the State. The Principal should have suitable staff support. A strong State program can be built only through the coordination of all research at the various Agricultural Colleges and branch Stations.

Within a State, as at the national level, an organization should be provided to assess the agricultural problems and the effectiveness of the current research programme to solve such problems. In certain States a State Research Board has been established to serve in this role. It is recommended that a coordinating body of such nature be set up in all States. Such a body should have representation from all segments of research relating to agriculture, including irrigation.

Coordination of Centre - State Research

The need for regional research to be conducted within a State by Central personnel already has been emphasized. Strong programmes to conduct local research and to participate with Central personnel in problems of regional nature are equally important. Research installations from the two agencies within a State invariably raise problems of coordination and duplication of facilities and equipment. Stationing of Central personnel at State stations was recommended by the First Team. In only a few cases has this recommendation been implemented. The Team feels strongly that maximum coordination between scientists of the Centre and a State agency is facilitated by their sharing common offices, laboratories, equipment and other facilities. Further, this system has pronounced advantages in that it makes for economy by eliminating duplication of facilities and equipment. The Team is convinced that an integrated system can be established even though research objectives of the personnel may vary.

The need for branch stations to conduct research on problems unique to an area is clearly recognized. On the other hand, establishment of branch research stations is contrary to the principle of centralizing scientists and equipment in the interest of most effective utilization. It is a corollary, therefore, that the number of branch stations be held to a minimum commensurate with actual needs.

A recent report of the Agricultural Administration Committee recommended the establishment of a major regional research station in each agro-climatic region of the country. It was estimated that at least 50 such stations would be required. A team of scientists from the various disciplines required would be located at these regional stations. The Team endorses this recommendation and further recommends that, whenever practicable, branch, State and Central stations in the area should be combined and integrated with the regional agro-climatic stations.

The Team is fully cognizant that the applied research results at a single location have limited applications throughout a wide area. Through the establishment of uniform trials throughout a given agro-climatic region a scientific basis could be provided for determining the numbers and locations of branch stations required. It is recommended that the location of branch stations, in so far as possible, be placed on a scientific basis with the objective of reducing the numbers commensurate with actual needs.

The integration of branch and regional stations of Central research institutes and Commodity Committees with State stations is strongly recommended. Regardless of the administering agency, it is felt that dispersal of personnel and equipment should be kept to a minimum. In the interest of promoting harmonious relationships it is recommended that all personnel at such stations be under the administrative control of the State. However, the selection, promotion and technical control should be retained by the parent agency.

The First Team recommended the negotiation of memoranda of understanding between the Centre and States. The need for such memoranda to establish a basis of relationship and understanding between agencies is recognized. Attention of the Team was drawn to this need particularly by the current establishment of PIRRCOM centres. While the basis for joint State-Centre cooperation in PIRRCOM Centres, even to the point of providing for sharing of buildings and facilities, has been outlined in a brochure that is in the process of preparation,

a lack of understanding was observed on the part of both State and Central personnel immediately concerned with such centres. Participating agencies should negotiate a memorandum of understanding defining the responsibilities and cooperative nature of the establishment and function of these stations. This would strengthen the programme and promote better State-Centre relationships. It must be emphasized that detailed provisions of such memorandum should not be restricted to the administrative level. Participating personnel at the project site itself should be familiar with such documents.

Increasing Incentives, Morale and Scientific Integrity of Agricultural Research Scientists.

The morale of agricultural scientists, particularly in agricultural colleges and State stations, in general, was observed to be unsatisfactory. The vigorous and enthusiastic attitude generally associated with research workers was not evident. Without incentives to stimulate enthusiasm, scientists are unlikely to develop a dynamic research programme. Recently, a Committee,* appointed by the Government of India, to examine the question of competence and productivity of research workers, prepared an excellent report. Factors were listed relative to research-morale, incentives, enthusiasm and research quality. A few of these factors will be commented upon.

Many scientists are appointed to temporary posts. The proportion of permanent to temporary posts in the various States was found to be approximately 60 per cent permanent and 40 per cent temporary. It was observed that those holding temporary posts do not give whole-hearted attention to their research duties. In fact, much of their time is devoted to seeking a secure position or justifying the extension of short-term schemes on which they are working.

In filling research posts, seniority is still the dominant consideration. Direct recruitment should be made to fill most positions of higher level. It should be emphasized, however, that departmental officers should be given full opportunity to compete for such posts.

Seniority is also rated high in the existing procedures for promotion. In some States merit is recognized, particularly in promotions among Class I officers. It is felt that merit should be the primary consideration for selection of candidates to be promoted.

* Report of the Agricultural Administration Committee, 1958

In many States, the complaint was heard that research personnel are frequently shifted from their field of specialization to other posts for which they are not qualified but to which they are entitled by virtue of seniority. Every effort should be made to enable scientists to continue in their specialized fields of work. Super-numerary posts should be created as and where necessary to permit advancement of scientists who have shown competence in their research specialty. Promotions should be made on the recommendations of a panel of scientists rather than by one individual.

In some cases, research results of scientists have been appropriated by their senior officers. In the interest of stimulating initiative and incentives, it is highly important that scientists receive proper credit for the personal contribution they make in planning, conducting and analyzing research results. It is also highly important that research workers assume an active role in the conduct of research. The tendency for scientists to become desk officers and delegate conduct of research wholly to subordinates and even to non-professional employees should be discouraged. Research results are reliable only if every critical operation is observed by an individual who has scientific knowledge relative to the objectives of the experiment, and who has adequate judgement to recognize any deviation in techniques that might bias the results. The need for research officers to personally observe the conduct of research should be emphasized in the interest of increasing the quality of results. In the evaluation of research officers, particular emphasis should be given to their research initiative and competence rather than other qualifications such as administrative efficiency.

The Study Committee referred to above made a number of suggestions relating to special measures to increase the incentives. Listed among these were awards and recognition for research contributions that have immediate practical significance or that advance existing scientific knowledge, fellowships to productive individuals, assignment of staff members to advisory or scientific committees on the basis of quality of work rather than seniority, and promotions on the basis of research quality. The Team heartily endorses these recommendations.

Integration of Education and Research

The need for close association between education and research has been stressed elsewhere in this report, particularly with respect to suitable organization. The advantages of such integration merit special emphasis.

Research unquestionably provides the foundation for agricultural education. Effective teaching can be accomplished only through a continuing process of revising the type and content of courses, by incorporating the most recent research findings. Additional advantages also accrue in establishing joint positions of education and research. The stimulus of research has been found to be invaluable in developing dynamic teachers. It is not to be inferred that only research men make good teachers, yet lack of association with a research programme frequently leads to stereotyped course content and lecture notes. Hence, the stimulus provided by research to teachers should not be underestimated.

In the centres providing post-graduate training there are additional advantages in integrating research and teaching programmes. Opportunities for continuous contact with research men are afforded to graduate students. Further, the conduct of a special research study to be used as a thesis problem in partial fulfillment of the requirement for an advanced degree is thoroughly integrated with the course work given. Agricultural research also benefits from such integration. Special studies conducted by post-graduate students can be so organized that they form part of the overall research programme and thereby make significant contributions. The net result is that a senior research officer may associate graduate students working under his direction with his programme as part-time research assistants. This arrangement is mutually advantageous.

CHAPTER IV.E X T E N S I O N

The First Team made 16 recommendations that applied specifically to Extension. Additional recommendations were made by that Team which had some application to Extension. These appear in various parts of the Report under such headings as Administration and Personnel Management.

Certain of the recommendations made at that time have been adopted in whole or in part. Changed situations since 1955 have made other recommendations unnecessary or inadvisable. Still others are on the shelf waiting for the appropriate time and opportunity to implement them.

However, no one should assume that progress has not resulted from such recommendations. The Team heard these discussed at length at every institution visited and by many individuals contacted. In general one can say that the recommendations of the First Team had an impact upon the thinking of the leaders in India and have resulted in a critical examination by its leaders of the problems involved.

Current Situation

The National Extension Service was inaugurated in October, 1952. Agricultural extension has since gained great significance in India's development programme. The Extension Commissioner at the Centre has the responsibility for the training of the village level workers, known as Gram Sevaks (Men) and Gram Sevikas (Women).

Already 34,557 Gram Sevaks and over 1,500 Gram Sevikas have been selected and trained. There are 6,104 men and 808 women in training.

The training period is 2 years for men and 18 months for women. The training is done at more than 100 centres, each of which has a farm for practical training. It is estimated that by 1963 there will be 50,000 men and 5,000 women serving as village level workers.

The Principals at these training centres are recruited by the State Agriculture Departments. Other teaching staff members for subjects such as Cooperation, Animal Husbandry, Health, etc. are selected from the respective Departments of the State.

The Community Development Blocks are administered by the State Development Department through the Block Development Officers, who are not necessarily agricultural college graduates. There is one Agricultural Extension Officer at each block who is an agricultural graduate. He is responsible administratively to the Block Development Officer but takes his technical advice from the State Agriculture Department. The four or five other extension officers in the Block are recruited from such Departments of the State as Health, Education, Cooperation, Animal Husbandry, etc.

The Block personnel instruct the village level worker in the duties that must be performed. In addition to these educational functions, the village level worker has many service responsibilities. However, the decision has been taken that he must devote 80 per cent of his time to agriculture. This decision, when implemented, will aid in meeting the emergency food situation.

Most of the colleges of agriculture and a few of the veterinary colleges have recently established Extension Departments or Sections. Some of these have but one staff member at present. In a few cases more adequate staff and facilities have been provided. In most instances the Head of the Section is responsible to the Principal.

Most of these colleges, particularly agriculture, have a Community Development Block attached. This provides training opportunities for the students. At present, few, if any, Home Science Colleges have such opportunity for the training of their under-graduate students.

Basic Principles

The terms of reference specifically outlined the areas in which this Team was to operate. Other committees and teams have recommended specific methods of attaining increased food production. This Team recognized that a strong, well-coordinated extension set-up would contribute substantially to increased food production. Therefore, special attention was devoted to ways of strengthening India's new extension organization.

Certain basic principles that could prove helpful in making Extension work more effective are as follows:

Objectives:

It is essential that extension purposes and objectives be set forth clearly. This is imperative to guide activities, to insure proper use of funds, and to evaluate progress made. The objectives of the extension service should be to bring to the people of India, especially the rural people, the results of research and improved farm and home practices through all available educational means, and to encourage their application. Currently the goal is increased agricultural production. The goal may change from time to time but the objectives always remain the same. The Extension service should thus be organized and evaluated in terms of the basic objectives established.

Education

It is a well recognized principle that an educational agency such as the extension service should be free to devote its entire effort to the transfer of knowledge and to secure its adoption unhampered by functions that detract from this purpose. This objective can only be achieved when extension is fully integrated with the agricultural research and educational arms of State and Central Governments.

Organization and Administration

The organization should be simple and direct in its line of authority from top to bottom. Responsibility with authority should be delegated to avoid innumerable delays and unnecessary duplication that stifle initiative. Dual controls do not permit delegation of authority; as a consequence, administrative efficiency is lowered and accomplishments lessened.

Financial Support and Control

The allocation of funds and their control should always be viewed from the standpoint of the basic objective and of goals fixed from time to time. If the present goal is to produce more food, then financial support for such a programme should be given where food of the right kind and quantity can be produced quickly during the emergency that exists. The budgeting and accounting procedures should remain sufficiently flexible and simple so that decisions at various levels can be made without unnecessary delays.

Personnel

A few basic principles in personnel management are fundamental in providing an efficient and effective staff. These can be stated as follows:

1. The staff should be adequate in number and quality to discharge its responsibilities.
2. The selection of the staff should be delegated to those directly responsible for the action desired. This person or persons should be free to choose the best trained and experienced personnel, subject only to the approval of the administrator in direct charge.
3. Another basic principle of administration is to provide ample incentives. These should be based on merit to encourage and maintain able and productive staff members. One valuable incentive is to provide opportunities for training and professional improvement. These incentives should provide for the growth of the individual, and of equal importance, assist in meeting the rapid changes taking place in agricultural technology.

Programmes

The extension programme should be built around stated objectives and goals within the national policy and based upon the needs of rural people. It should originate at the farm home, utilizing research and scientific information to attain desired results.

A long standing principle in extension work has been - help others to help themselves. This can best be done by involving people in programme decisions, in the conduct of demonstrations and meetings, and in volunteer committee leadership.

Coordination

Agricultural extension work can be effective only when linked to research and education. Teaching institutions in agriculture are now endeavouring to integrate their activities in accordance with this principle. The Agricultural Departments of the States have the responsibility for food production. The ultimate objective should be to unify research, education and extension activities of Agricultural and Veterinary Colleges and rural universities in association with the State Departments, in order that free flow of technical advice and guidance can be achieved.

Community Development Organization

Central Ministry of Community Development

The responsibilities for the general administration and coordination of the community development programme are vested in the Ministry of Community Development. This Ministry provides the central guidance and coordination for the functions and working plans in the different subject-matter fields developed in cooperation with the various State Departments or Central Ministries. The Community Development Ministry has on its staff a corps of subject matter specialists. This Ministry also makes the financial grants to the States for the Development blocks.

Ministry of Food and Agriculture

The Extension Commissioner of the Ministry of Food and Agriculture has the responsibility for the general supervision and coordination of arrangements for the training of village level workers and Gram Sevikas. The Extension Wing under the Extension Commissioner has a Farm Advisory Service composed of subject matter specialists. The Wing also has an Agricultural Information Service. In the Department of Agriculture of the Ministry there are again various subject matter specialists (Advisers) like Irrigation Adviser, Livestock Development Adviser, Soil Conservation Adviser, Fisheries Development Adviser, etc. The Indian Council of Agricultural Research, the technical arm of the Ministry, has its own subject-matter specialists.

States

Community Development, including coordination, in the States is the responsibility of the Development Commissioner who is normally a senior officer. Extension training at the centres is also his responsibility except in one or two cases where the State Agricultural Departments have such responsibility. The Development Commissioner draws the Block Development Officer and subject-matter specialists for the Blocks from the various departments of the State like Revenue, Agriculture, Education, Cooperation, Animal Husbandry, Health, etc. Most of the Block Development Officers are not agricultural graduates. The Agricultural Extension Officer at the Block is under the Block Development Officer but takes technical guidance from the District Agricultural Officer, who belongs to the State Departments of Agriculture.

Identification of Problems

There would seem to be confusion in the minds of many relating to the purpose, objective and function of extension work in India. This is common to any newly created organization. In India this may be due to four basic factors: (a) the brief time since the National Extension Service was established, about seven years ago, (b) the addition of the community development work with its multi-purpose functions, (c) the absence of adequate, trained and experienced personnel, and (d) the absence of a direct and coordinated administration.

Objectives

It would seem desirable that the purpose, objective and goals of the extension service be increasingly and frequently brought to the attention of the people so that there may be unified thinking and action. This is a service that can best be performed through the personnel at the Centre.

Education

The Extension organization and advisory services in many other areas of the world have been obliged, from time to time, to re-assess their functions in the light of the purpose for which they were created. Following this review, necessary action has been taken to eliminate responsibilities that impede educational objectives. The Extension Service of India may have reached the stage when such re-assessment should be done. This Team, like the first and similar committees, recognize this need at the Block and Village levels.

Opportunities should be provided for students of agriculture, veterinary science and animal husbandry and home science to undergo training in extension methods. This may be provided through the addition of an extension section or department in agricultural and veterinary colleges. It is advisable for such college extension sections to have Community Development Blocks attached to them for training purposes. The agricultural, veterinary and home science colleges not only should be prepared to provide an increasing number of students with some training in extension methods, but also to give refresher courses to the Block staff and village level workers.

The Team recommends that the supply of extension information material in the local languages be stepped up and provided from the agricultural colleges rather than from the

headquarters of the administering department. The information unit and the presses should therefore be located in the State agricultural colleges so that the free flow of information results from the research departments after adequate processing.

The Team recommends that a clear demarcation of the areas should be made as between the Central extension agencies and those of the States, in the matter of supplying information material to the cultivator, so that both may work complementary to each other.

Organization and Administration

Organization and administration are so closely interwoven that it seems inadvisable to discuss one without including the other. Proper organization is necessary for efficient administration, yet efficient administration may not always follow as a result of desirable organization. It is the opinion of the Team that the extension service is not making its greatest contribution to increased agricultural production, due in part to divided responsibility at the Centre, dual control at the Block level and innumerable administrative details all along the line. Nowhere in the field of agriculture, if action on the part of the farmer is to result, is there greater need for a simple, direct and flexible type of organization and administration than in the extension service. The objectives, procedures, and responsibilities with authority, must be clear and unhampered by administrative shortcomings. Administrative officials charged with securing results must constantly guard against the development of budgetary details, accounting procedures and services that interfere with the satisfactory attainment of the established objective and goals.

At the National Level

It would appear that the entire Extension activities of the Community Development Ministry, the Extension Wing of the Central Department of Agriculture (Ministry of Food and Agriculture) and the I.C.A.R. should be more fully integrated to provide a direct and efficient service. There is a feeling that the Community Development project and the National Extension Service have not produced the impact of their early promise on agricultural production although more than half the country is now under this organization. There is considerable administrative confusion arising out of dual or even multiplicity of control over the workers. There is a general tendency at all levels to shift the responsibility to the next man. It has been

stated repeatedly that increasing agricultural production is the prime function of the Community Development programme and that 80 per cent of the time of those engaged in the Blocks should be devoted to improving agriculture and agricultural production. But this is hardly ever done anywhere. The responsibility for stepping up agricultural production has been fixed on the Agricultural Department, but that Department has no control over the staff provided to carry out this work, with the result that the Department has not been able to generate the momentum required to give a push forward to this important programme. Unless the administrative machinery is streamlined and the people responsible for the work are given full control over the staff, results commensurate with the funds expended and efforts put in, are not likely to be produced. The following reorganization is therefore suggested with a view to bring about a greater coordination of work and better integration of the machinery.

At the Centre, Community Development should constitute a wing of the Food and Agriculture Ministry. Agriculture, Community Development, Cooperation and Food should be under the over-all control of the Minister for Food and Agriculture. The same unified organization should be adopted at the Ministers' level in the States also. The Development Commissioner should be the Secretary to Government, Agriculture, Veterinary, Animal Husbandry, Cooperation and Panchayat Departments. He should be adequately supported by additional Secretaries to leave him sufficient time for supervising field work. The Development Commissioner will then be able to exercise more effective control over the work of the various departments concerned in Community Development and bring about better coordination between the staff of the various Departments working in the Block. Increasing food production involves organization of people through panchayats and people's agencies, mobilization of economic resources through cooperatives and introduction of improved techniques of agricultural production. These three should be so integrated and welded that a single unified organization is available to the nation for forging ahead.

The function of the National Extension Service, the Team believes, is to provide leadership and guidance to the State personnel in (i) the selection and training of extension personnel, (ii) the development of programmes, (iii) the simplification of budgets, accounting and service functions, and (iv) in the reorganization and reassignment of staff and personnel - always with emphasis on providing leadership.

At the State Level

Although the organization and administration of extension work varies somewhat from State to State, yet in general the Team found too much passing on of responsibility from one level to the next until it reaches the VLW who then is expected to perform miracles.

The State Agricultural Departments have responsibility for agricultural production. Yet neither the agricultural extension officers at the development blocks nor the village level workers are under their administrative control. The Agricultural Extension Officer at the Block receives technical guidance from the State Agricultural Department. On the other hand, he is administratively responsible to the Block Development Officer. This arrangement reduces his effectiveness. This is more apparent when it is considered that the Village Level Worker is a multi-purpose worker. He receives instructions from several other Block personnel having no direct relation to agriculture, which he is expected also to carry out.

The Agricultural Extension Officer at the Block is a general purpose man. There should, therefore, be attached to the Blocks agricultural specialists in Soil Conservation, Plant Protection, Horticulture, Agronomy, or other fields necessary to meet the needs of the area. A start may be made by the addition of such specialists at District and Block levels on a pilot basis. District specialists should work directly with and assist the Extension Block officer and the Village Level Workers to reach the cultivators.

Reference has been made to the multi-purpose nature of Village Level Worker's duties. These duties have prevented him from giving effective attention to agriculture. This has been recognised in the policy decision by the Government that he should now give 80 per cent of his time to agriculture. It is difficult to see how this can be attained unless he is relieved of some of his multi-purpose duties, such as the improvement of streets, buildings, performing service functions, or other time-consuming duties that have only an indirect relation to agricultural production. The Team feels that these duties can be performed by the Panchayats, if grants are passed on to them from the block budget.

Financial Support and Control

This Team is of the opinion that funds should be allocated more largely to those areas where immediate possibilities exist for increasing food production. Where food production has top priority, then the extension personnel charged with such responsibility must be increased in such areas.

The First Team, as well as this, has had brought to its attention what would seem to be unnecessary budgetary and accounting procedures. The Agricultural Administration Committee in its report of October, 1958, again points out this problem. Where the extension personnel must perform effective field work and if its contribution to increased food production is to be tangible, accounting procedures, especially at the village level, should be kept at a minimum, and such responsibilities discharged by those not required to do extension work directly with the farmer.

Extension Personnel

There are at least four important points incidental in maintaining an efficient and effective extension staff in India.

1. Selection: The traditional methods of employing research or teaching staff cannot and should not apply when selecting extension personnel. The plan followed should permit the men directly in charge to choose and recommend for immediate approval the employment of the best trained and experienced workers that funds available will permit. The traditional emphasis on advanced degrees cannot at the outset be the criteria for selection. A farm background, agricultural experience, ability to work with, and influence people are important considerations in developing an effective staff in the early history of extension services. The methods followed may vary but every effort should be made to fill positions promptly with the best personnel available; under no circumstance should political preference be permitted.
2. Adequate Numbers: An adequate number of staff members must be provided to produce the results expected. This Team has frequently been reminded of this in such key areas as the Block level where one Agricultural Extension Officer is the usual pattern and with but one Village Level Worker carrying a superman's load. The last is probably the biggest bottleneck in transmitting

scientific methods to the farmer and securing adoption of practices that will aid in the present goal of increased food production. The paradox of limiting the number of VLWs per block to 10 and of not limiting their duties or field of operation has to be faced and resolved.

3. Training: The importance of providing training opportunities for extension personnel is receiving widespread attention throughout India. The Team would commend this effort and point out only a few areas where it believes such training can be strengthened. One area recently receiving emphasis is the Extension section in the colleges referred to in the chapter on Education. It is expected that at the undergraduate level electives will be provided for students desiring courses in agricultural extension. Courses in extension methods will include visual aids and other communication methods. Furthermore, it is imperative that colleges start such training of undergraduates at once in order to meet the demands for trained extension personnel.

The extension training centres are now providing two-year training opportunities for Gram Sevaks and for eighteen months to Gram Sevikas. Much progress has been made in the brief time since these centres were established. The Team has gained the impression, however, that additional instruction is needed in such subjects as soil and water conservation, irrigation, dairy, and poultry husbandry, since these subjects are not receiving the emphasis that a rapidly changing agriculture demands.

In-service training of Block level workers and district officials and personnel should be continued. It would appear that insufficient opportunity has been provided to acquaint certain personnel with the problems of the farmers and research answers available. The instructional staff should be carefully selected in order to contribute intensive practical training. Moreover, the Team is of the opinion that extension personnel should be trained by those having the experience and ability to deal with adults.

4. Incentives: Efforts should be continued with greater emphasis in some cases to reward work well done and especially by those who have little opportunity for promotions. These incentives may be in the form of public recognition, merit increases in salaries and in other ways. Especially should consideration be given to incentives for VLWs. The Team understands that there are distinct status barriers between these workers and block staff members and between the Block Development Officer and members of his staff. It would be helpful if this situation were changed.

In a few years there will be 50,000 VLNs and 5,000 Gram Sevikas. Among these men and women are potential leaders of the future. Opportunities should be provided for workers of ability to obtain college training. This would necessitate provision for scholarships, continued pay and leave of absence. Such encouragement would enable the lowest paid extension personnel to become better educated. This would help to provide more trained and experienced agricultural leaders.

Programme Participation

It is typical of all newly created services that projects and programmes are developed at the top and carried out without consulting those for whom such work is intended. As the purpose, objectives and functions of extension work become better known, the people involved should be brought together to consider what, how, where and when extension projects should be undertaken. This would help accomplish the goals agreed upon.

The Team was informed that in a limited way volunteer leaders and committees are working on newer methods and improved practices. This is an effective and inexpensive way to introduce changes. Volunteer leaders and committees are especially important for such assignments as increased food production.

Home Science

It was the privilege of the Team to visit one of the Home Science Colleges and to see one Home Science Wing of an Extension Training Centre. We commend this effort to take scientific knowledge to the home of this great nation. The Team believes this effort should be extended and closely associated with agriculture. For Home Science knowledge has as valuable a contribution to make in India as in other parts of the world.

Youth Work

Nowhere has the Team had the opportunity to see organized youth work, similar to the 4-H Club organization in the United States. The leaders of tomorrow are the youth of today. The extension organization should encourage the development of rural youth programmes to facilitate changes in methods and practices.

Relation of Research, Education and Extension

It is commonly accepted today that research and college education should be closely associated and integrated. It is equally important that extension be brought into partnership with research and teaching. Extension is dependent upon both. It must look to the colleges for its personnel, trained in both agricultural subjects and in the knowledge of skills of dealing with and influencing people. Extension is the educational agency that transfers research findings from the laboratory to the farm. Moreover, it brings back to researchers and colleges the immediate problems of the farm and home for which answers should be provided. The ultimate objective, then, should be to make agricultural extension work at the State level the responsibility of the State agricultural colleges. This would bring about integration of research, education and extension. It should always be remembered that, at the farmers' level, all agricultural activities are integrated.

CHAPTER VFACTORS COMMON TO RESEARCH, TEACHING AND EXTENSION
THAT INFLUENCE FOOD PRODUCTIONResources and allocations

In the First Five Year Plan, 234 crores or 9.9 per cent of the total public outlay was earmarked for agriculture, excluding 5.2 per cent for Community Development and Cooperation and 16.3 per cent for multi-purpose and major irrigation projects. Under the First Plan, the index number of agricultural production (base 1949-50) increased from 100 in 1949-50 to 117 in 1955-56. In the Second Plan, the share of agriculture and Community Development was 11.8 per cent of the over-all Plan outlay, though the actual provision viz., Rs.568 crores is higher than in the First Plan. The actual provision for agricultural programmes amounted to 6.1 per cent only, though some additional provision was made later in respect of food production schemes. By 1958-59, the index number of agricultural production reached 131.

The Third Five Year Plan contemplates much heavier investment in the industrial sector than hitherto, so that the resulting strains and stresses for the economy will have to be met by corresponding development in the agricultural sector. This is clearly set forth in the publication entitled "Approach to Agricultural Development in the Third Five Year Plan" released recently by the Ministry of Food and Agriculture.

The Agricultural Production Team of the Ford Foundation recommended that the Third Plan target for food grains should be 110 million tons, or 36.5 million tons more than 1958-59 production. It was concluded that no conceivable programme of imports or rationing could meet a crisis of this magnitude; hence emergency action is called for.

The Ministry of Food and Agriculture, Government of India has emphasized that agricultural research is the foundation for development work to be undertaken in any Plan. Furthermore, provision for qualified and trained personnel at various levels is a pre-requisite for effective research, education and extension programmes. It follows therefore, that adequate provision for agricultural research, education and extension would be essential under the Third Plan.

For the Third Plan, the proposed public outlay is Rs.1000 crores, of which agricultural research and education will have a provision of Rs.56 crores, and agricultural extension training, farm advisory centres and administration 48 crores; animal husbandry Rs.80 crores, dairying Rs.60 crores; mixed farming Rs.20 crores; development of commercial crops Rs.53 crores; soil conservation Rs.115 crores and minor irrigation Rs.254 crores. The break-up of the provisions for agricultural research and agricultural education as indicated in the Working Paper shows that the coiling is Rs. 38 crores for the former and Rs.18 crores for the latter. Of the provisions for research, Rs.20 crores are envisaged for strengthening agricultural research in the States while a token provision of Rs. 2 crores is made for implementing the recommendations made by the Second Joint Indo-American Team, leaving a balance of Rs. 16 crores for research on all crops and subjects to be carried out through the Central Institutes, Commodity Committees and State Governments.

The above provisions for the Third Plan are not impressive when viewed in the light of the crisis in food production.

This Team is reluctant to suggest specific items of work to be financed by the token provision of Rs. 2 crores, for to do so might imply that this amount would be adequate to solve India's gigantic food production problem. Instead, it is strongly urged that the recommendation of the First Joint Indo-American Team be implemented in this regard by making Rs.10 crores available for agricultural research.

This sum of Rs.10 crores should be in addition to the Rs.20 crores suggested by the Working Group for strengthening agricultural research in the States. This is justified because a substantial part of the Rs.20 crores is needed for building up State research organizations, especially by strengthening State research sections through reorganization. Otherwise, it would not necessarily have an immediate impact on India's agriculture. Tangible results would be forthcoming with less delay if a high level body were given the responsibility for selecting agricultural research problems on all-India basis. Allocating Rs.10 crores to the solution of national problems of immediate concern to increased food production would be eminently worthwhile at this stage of India's economic development.

It is recommended that this sum of Rs.10 crores should not be spent until after the Agricultural Research Policy Council has been named and has had time to select the problems and establish priorities. This probably would mean that no expenditure would be made in the first year, hence the entire sum of Rs.10 crores could be earmarked for expenditure from the second to the fifth year of the Third Five Year Plan.

Since the above discussion relates to the nation's total resources insofar as National Plans are concerned, any assessment of the use of resources for research, education and extension programmes also should take into account funds other than those available to I.C.A.R. and the State Governments. Thus, the resources of the Commodity Committees should be fitted into the total expenditure for research, education and extension.

Administration

The importance of agricultural administration and personnel management in improving efficiency and in developing technical leadership in agricultural research, education and extension was dealt with in considerable detail by the First Joint Indo-American Team. This was again the subject matter of a Special Agricultural Administration Committee set up in 1958 under the chairmanship of Raja Surendra Singh of Nalagarh. That Committee also made very comprehensive recommendations for streamlining agricultural administration and for removing some of the serious lapses that clog the wheel of progress. This subject again received the attention of the Agricultural Production Team sponsored by the Ford Foundation.

This Team strongly endorses all the recommendations concerning agricultural administration made by the First Joint Indo-American Team, the Nalagarh Committee and the Ford Foundation Team.

The Team notes with disappointment that many of the important recommendations made by the First Team and the Nalagarh Committee have not received adequate attention of the State Governments. In many of the States, the post of Director of Agriculture is still held by non-technical men. Highly qualified senior scientists are put to the indignity of having to work under the non-technical leadership of comparatively junior officers of the administrative service. There is still considerable disparity between the scales of pay of the senior posts in the Agricultural Departments and similar posts in other Departments of Governments. Even in the States where pay scales have been recently revised and upgraded, it is disconcerting to note that this disparity has been allowed to continue. Promotions and appointments to senior posts still are made on considerations of seniority, and qualifications and merit often find little recognition. It is understood that recently in one of the States posts of Plant Breeder were filled from amongst subordinate officers of the Extension Branch on the basis of seniority alone although men qualified in plant breeding work were available in junior ranks. Research Scientists and Department Heads complain that they continue to be burdened with much administrative detail to the detriment of their scientific pursuits. Technical officers have little voice in the formulation of agricultural policy.

In most State Departments of Agriculture there is a dearth of suitably qualified and experienced men at the lower levels to take the place of the present Chiefs when they retire or are transferred to other posts. There is wide disparity between the positions and emoluments of the Chiefs and the next subordinate officers. Such wide disparity prevents the development of self-confidence in the junior officers even when they are qualified. It is, therefore, necessary to provide more intermediate posts so that there will be a regular flow of suitable men to fill the higher posts in the Departments. Heads of the technical departments should keep a watch on the staffing pattern to see that there is adequate number of suitably qualified and capable men in the various disciplines and grades so that a continuous flow of qualified and experienced men would be available to fill strategic positions. This requires considerable foresight, a desire to develop the Department as a composite unit, a pride in the Department and the contribution it can make toward national development. This will not be possible if the Head of the Department is a transitory administrator with no intention of making a career in agriculture,

An all-out drive to rapidly increase food production requires a thorough integration of the activities of the various departments, e.g., Agriculture, Veterinary and Animal Husbandry, Cooperation and Panchayat, Development and Irrigation. To bring these Departments together and integrate their activities, it is recommended that a State Food Production Committee be set up under the chairmanship of the Chief Secretary or the Development Commissioner to discuss programme of work, to review progress, to remove bottlenecks and to iron out differences from time to time.

While the participant programme of the TCM and the training facilities afforded by the Colombo Plan have been utilized for training of staff members employed in research and education, the extension staffs of the Departments have scarcely been affected by available training programmes. Training of extension personnel should be accelerated both in India and abroad.

Agricultural graduates at the present time are in short supply. All graduates from agricultural colleges find immediate employment. In many States, therefore development programmes are held up due to non-availability of qualified personnel. There are a number of other Departments closely connected with agricultural production which would benefit greatly from the employment of agricultural graduates. Cooperation, Panchayat, Irrigation, Revenue and Education Departments would considerably improve their effectiveness by recruiting agricultural graduates

in increasing number. In a predominantly agricultural country like India, knowledge of problems connected with land is beneficial to all ranks of officers dealing with agriculture and land problems. Such knowledge facilitates understanding of the problems of farmers. To meet the increasing demand for agricultural graduates, steps should be taken to expand facilities available in the State Agricultural Colleges.

The enormous development of the Agricultural Departments and the heavy and many-sided functions they are called upon to perform have placed heavy administrative responsibilities on the heads of Departments and the Chiefs of the various important sections of the Departments. Many of these duties are of a non-technical and routine nature, but they arise out of the technical responsibilities assumed by the Departments and are inevitable in large programs. Training in administrative matters has, therefore, become imperative and urgent to certain sections of the Agricultural Department staff, particularly to those in charge of extension and to the District and Divisional level officers. Facilities for such training in administration should be provided to such officers. Agricultural officers thus trained in administration may be posted as Administrative Assistants to Heads of Sections or as Administrative Officers in charge of large offices, to relieve the technical officers of their routine administrative details. It would also be very helpful if such agricultural officers trained in administration were selected for posts of Under Secretaries and Deputy Secretaries in Agricultural Departments and Secretariats. This would help minimize the long delays now so common arising out of inadequate understanding by some of the Secretariat officers of the projects prepared by technical officers.

CHAPTER VILAND AND LIVESTOCK RELATIONSHIPS

According to the 1956 livestock census, cattle in India number 158.6 million; buffaloes 44.9 million, sheep 30 million, goats 55.4 million, besides 8.3 million of other livestock such as horses, ponies, etc. The number of poultry is 94.7 million. All these and 400 million human beings derive their sustenance from 320 million acres of net area sown. The former naturally, therefore, have to subsist mostly on the by-products of agricultural produce and the scanty and precarious grazing available in fallow lands, culturable wastes or other unproductive lands. It has been roughly estimated that as compared to the total requirements of balanced nutrition for livestock, there is a shortage of 26 million tons in regard to straws and karbi, 250-300 million tons in regard to green fodder and 25 million tons in concentrates, i.e., gram, bran, oilcakes, etc. This approximately constitutes a deficiency of well over two-thirds of the optimum concentrate requirements. Grazing resources theoretically appear adequate but they also include grazing available in forests which because of their inaccessibility cannot, by and large, be utilized. There is a heavy shortage of roughages as well, though it may be assumed that the increased production of food grains planned under the Five Year Plans would tend to make up for the deficiency in regard to straws and karbi. The deficiency in green fodder and concentrates would be further accentuated by the constant increase in the number of livestock.

Agricultural research, teaching and extension can make maximum contribution to food production in India only when livestock numbers are brought into line with supplies of fodder and forage. It is for India's political and socio-religious leaders to determine the role, if any, of a cattle slaughter programme in this regard. The paramount issue, however, is not whether a nation wide cattle slaughter programme should be sanctioned, but rather whether India is willing to recognize the urgent economic necessity of adjusting cattle numbers.

Research is needed on the extent of the adjustment that should be made and on ways and means of effecting changes within the framework of Indian concepts and beliefs. Above all, is the need to relate animals to the land and the crops grown thereon. This fundamental relationship is particularly important to the cultivator, for his land and livestock operations, of necessity, are totally integrated.

In the past, research programmes, college curricula and extension activities have been compartmentalized to such an extent that land and livestock relationship have had little bearing on what has been taught to students or recommended to farmers. As a consequence, the development of Indian agriculture has been retarded immeasurably.

Substantial progress has been made by the veterinary profession in India in the prevention and control of animal diseases. Similar progress has not been made in the field of animal husbandry. There are indications that a start may be made in the not too distant future to correct the imbalance between animal numbers and the feed supply, even though a widespread slaughter programme is not initiated. Other measures, such as mass scale castration of scrub bulls and controlled breeding, could help to bring this about. When this occurs, India will begin to realize the immense potential of her livestock resources.

As India's livestock industry develops and is placed on an economic basis, greater specialization will follow. Particularly will this occur in the case of poultry production and dairy development. Specialized production of sheep, goats and swine also will be inevitable consequence of the application of science and technology to agricultural problems.

Research, teaching and extension must provide technical know-how and leadership for the enlightened and progressive development of India's animal industries. Viewed in this light, there can be no question of taking anything away from the veterinary profession nor of adding something to the already large responsibilities of agriculturists. The development envisaged here will call for expansion and increased programmes and responsibilities of both groups. Those who study and deal with soils and plants will need to have at least a working knowledge of animal husbandry and of the elementary aspects of livestock sanitation and disease control. Likewise, those trained in veterinary medicine must continue to know about and deal with healthy animals; hence training in animal husbandry will need to be strengthened and kept up-to-date. Veterinarians, too, if they are to have a real appreciation of land livestock relationships and the economic significance of these relationships, should have some training, perhaps of an introductory nature, in subjects dealing with soils and plants.

Thus, if India is to develop its animal industries along sound economic lines there must be not only greater specialization for agriculturists, veterinarians and animal husbandry workers but unselfish and dedicated team work and cooperation among these groups of specialists.

To attain the degree of specialization that will be required for the long-range needs of Indian agriculture, animal husbandry should be given a distinct status both in colleges and in government. In government, an Animal Husbandry Department to deal with animal husbandry and dairy husbandry, poultry, sheep etc. should be the ultimate goal, but till resources become available, there should be an officer of the status of a Joint Director to deal with these subjects. Specialized training in animal husbandry should continue to be given in Veterinary/Agricultural colleges, but in separately administered sections, or departments. Where the veterinary college and the agricultural college are not located on the same campus, a separate section of animal husbandry should be provided on the agricultural college campus. Where the agricultural college and the veterinary college are located on the same campus, students of both colleges should receive their animal husbandry training in the section or department offering specialized work in this field. The same principle should apply with reference to training in other fields. Thus, veterinary students should receive their training in crops and soils in the college of agriculture, not in a special section attached to the veterinary college.

CHAPTER VIIINTER-UNIVERSITY CONTRACT PROGRAMME

Indo-American cooperation in agricultural education began in 1947 when the Government of India invited two Americans, Dr. John I. Tigert and Arthur E. Morgan, to serve on a University Education Commission under the chairmanship of Dr. S. Radhakrishnan, now Vice President of India. This Commission recommended that rural (Agricultural) universities be established in India.

Following discussions between the Ministry of Food and Agriculture, Government of India and U.S. Technical Cooperation Mission to India, an agreement providing for the establishment of the First Indo-American Team on agricultural research and education was signed in March 1954. That Team's report along with the report of the University Education Commission were the basis for the Inter-University Contract Programme.

In 1955 the Government of India and the U.S. Technical Cooperation Mission completed arrangements for five American Universities to assist 49 Indian colleges of agriculture and veterinary science and two research institutes. Each of the American Universities work with all the colleges in a region of two to four States. The initial agreement provided for 35 members of the U. S. Universities to work in India, 35 participants to go to the United States each year and \$1,250,000 for library, class-room, laboratory and field equipment.

The purposes of the Inter-University Contract programme are (1) to improve the administrative, professional and physical features of agricultural and veterinary colleges (2) to coordinate teaching, research and extension work of the participating institutions and (3) to increase the numbers and capabilities of college graduates who will contribute to increased production and better utilization of agricultural products in India.

Pertinent information concerning the contract programme as on December 31, 1959, may be summarized as follows:

	<u>Region I</u>	<u>Region II</u>	<u>Region III</u>	<u>Region IV</u>	<u>Region V</u>
Contract	University of Illinois.	Ohio State University	University of Missouri	Kansas State University	University of Tennessee
States	Uttar Pradesh, and Madhya Pradesh	Punjab & Rajasthan	West Bengal Orissa, Assam and Bihar.	Bombay and Andhra Pradesh	Madras, Mysore and Kerala
Starting Date	Oct.1955	Oct.1955	Oct.1957	Oct.1956	June.'56
Funds allocated	\$ 1,534,100	\$ 1,790,160	\$ 872,750	\$ 1,920,340	\$ 1,259,000

Currently, participating institutions are classified as follows:

Centre	0	0	0	1	0
State	8	4	9	7	7
Private	3	0	0	3	2

Currently, 27 technicians from American Universities are stationed in India under the Contract Programme. During the period the Contract has been operative, the equivalent of 85 technician man-years have been furnished to Indian colleges. Fields of specialization represented in this phase of the technical assistance programme include:

- Economics and Sociology
- Farm Management
- Agricultural Engineering
- Crops
- Soils
- Veterinary Science
- Animal Husbandry
- Dairy Husbandry
- Extension
- Home Science
- Educational Administration
- Poultry Husbandry

The contract programme provides for the training of staff members (participants) from Indian agricultural and veterinary colleges in American Universities. As on August 31, 1959, 72 participants had returned from the United States, 73 were studying in the United States, and a quota of 60 had been authorized for fiscal year 1959-60.

Fields of specialization represented by the participants who have received training in the United States are as follows:

- Veterinary Science
- Animal Husbandry
- Dairy and Poultry husbandry
- Soils and Crops
- Plant Protection
- Extension
- Administration
- Agricultural Engineering

With very few exceptions the participants are engaged in teaching, research, extension or administration.

In the majority of cases, participants have spent one year at American Universities. A few have gone for shorter periods; and opportunities have been provided in exceptional instances for training periods longer than one year to meet the requirements for an advanced degree.

Equipment and books for instructional and demonstrational purposes comprise the third type of assistance provided to Indian colleges of Agriculture and Veterinary science under the Inter-University Contract Programme.

Substantial progress is being made in attaining the objectives of the Inter-University Contract Programme. Four Years is a short time in the life of an educational institution. Yet it is significant that ways and means of attaining the objectives of this project are being discussed and implemented. There is a growing understanding and acceptance of the principle that agricultural research, teaching and extension should be integrated. Throughout India, agricultural leaders, largely because of the technical assistance effort under this programme, are recognizing the importance of integrating these activities at all levels from top administration to the villages, where, in the final analysis progress in the attainment of the basic objective of technical assistance must be measured.

One of the most significant developments resulting from the contract programme is the progress being made in the organization of agricultural universities.

A second contract has been signed with the University of Illinois for assistance in establishing a new agricultural university in Uttar Pradesh. Keen interest throughout India is being manifested in this project and several States are preparing plans and proposals for converting existing colleges and other institutions into agricultural universities.

Application of the results of agricultural research has been demonstrated by members of technical assistance teams in such things as grassland improvement, poultry and dairy production, crops and soils test plots, and the training of extension leaders and specialists. Participation of team members in research and teaching conferences is another important contribution to the overall technical assistance programme.

Another valuable contribution of this programme is the leadership being given in the preparation of text books by Indian scientists. There is an urgent need for teaching materials which focus attention on problems unique to Indian agriculture. Heretofore, teachers have been seriously handicapped because most of the text books available were written by foreigners, and hence were not particularly applicable to India, especially in so far as the practical application of scientific principles were concerned.

The Second Indo-American Team discussed the Inter-University Contract Programme with many Indian educators and government officials. There was general agreement that the project is useful in promoting the best interests of Indian agriculture. In a few instances, complacency and satisfaction with things as they are were evident. These were exceptions, however; in the vast majority of cases Indian approval and cooperation appeared to be whole hearted and satisfactory.

Training of Indian participants in American Universities deserves special emphasis in an appraisal of the progress being made toward the attainment of the basic objectives of the Contract Programme. It is expected that these men will take enhanced technical competence to their home institutions and a better understanding of how to identify and solve problems. It appears that these goals are being attained, though occasionally the desire of the participants to concentrate their efforts on a narrow specialty, or on the accumulation of thesis material for an advanced degree may be serious deterrents.

It was observed, also, that in some instances returned participants are not doing work for which they were trained in American Universities. This suggests that there should be a clear understanding before a participant leaves India as to what his position is to be when he returns.

After a study of the working of the Inter-University Contract Programme it is proposed that the following suggestions may be adopted for furthering the progress of agricultural research, education and extension.

The Inter-University Contract Programme should be continued at least through the Third Five Year Plan of the Government of India. It will be important in the years immediately ahead to follow through with technical assistance to specific projects.

Technical assistance should largely be concentrated in fewer colleges with special emphasis on those institutions which are likely to develop into agricultural universities.

A separate contract should be entered into with one American University to furnish technical assistance to colleges of veterinary medicine.

Technicians should participate with their Indian counterparts in conducting seminars and strengthening undergraduate and post-graduate teaching programmes wherever it is feasible to do so. They should not be used to fill vacant teaching posts, nor to meet the qualification requirements of the affiliated university to qualify a department or section to offer post-graduate work.

Participants should be selected on the basis of merit not seniority, and they should be under 45 years of age.

The length of training period approved for a participant should be governed by the needs of both the participant and his college. Undue stress should not be given to programmes leading to advanced degrees. In general, the training period should be for one year, though a longer period may be warranted in meritorious cases. Only rarely should short tours abroad be approved and then only when such assignments contribute directly to the objectives of the Contract Programme.

The contracting universities should schedule seminars or provide other appropriate means of fully acquainting participants with the organization, function and working relations of agricultural colleges in the United States. Mere training in specialized fields such as agronomy, veterinary medicine, or agricultural economics is not enough for meeting India's problems. Participants should understand the integration of research, teaching and extension, state-federal relationships, and numerous other aspects of American institutions that have made them so effective.

Funds should be provided for maintaining relationships with and giving assistance to returned participants. Arrangements for such liaison might well be extended to include all Indians who have had agricultural training in the United States.

In the allocation of funds for the purchase of commodities special consideration should be given to the needs of technicians and participants in order to further the objectives of the Inter-University Contract Programme.

All T.C.M. equipment supplied through I.C.A.R. for the research and teaching purposes should be exempt from customs duties.

CHAPTER VIIISUMMARY OF PRINCIPAL RECOMMENDATIONSAgricultural EducationBelow college level

1. The Team is aware that the Government of India contemplates the establishment of one hundred (100) vocational agricultural schools of the Manjri type. The goal should be to have one such school for each district. To achieve this goal and to ensure the necessary number of entrants, the Government should provide for payment of stipends adequate to cover the student expenses at the school.
2. The purpose for which these schools are established can be achieved only if adequate teaching staff and facilities are available. The Team recommends that minimum qualifications for a teacher be a B.Sc. in Agriculture with additional teacher training qualifications. Further, a farm of adequate size and facilities should be attached to each school.
3. A large percentage of the students passing out of these vocational schools should be encouraged to return to the land. Outstanding students who are suitably qualified should be enabled and assisted to pursue higher education at the University level.
4. The Rural Institutes, as presently organized, are serving no useful purpose in the agricultural education programme. The Team recommends that the Ministry of Food and Agriculture in cooperation with the Ministry of Education determine whether or not these Institutes could be organized as Vocational agricultural schools or Extension Training Centres, thereby becoming part of the agricultural education programme. The Team recommends that teaching of agriculture in Rural Institutes be discontinued.
5. The agricultural education programme would be strengthened by the establishment of additional Multipurpose High Schools where agriculture is one of the subjects taught. Again, the minimum required qualification for agricultural teachers should be a B.Sc. in Agriculture with additional teacher training qualifications.

To these schools should be attached a farm of adequate size, representing the pattern of agriculture in the region.

Under-Graduate Colleges

6. These colleges should be strengthened, wherever necessary by providing research facilities so that the majority of the teachers will be engaged in research in addition to their normal teaching duties.
7. All the colleges should be provided with a farm, dairy, poultry and similar facilities for teaching and research. In the case of veterinary colleges, adequate clinical material also should be provided.
8. Extension training should form an integral part of agricultural and veterinary colleges. A Community Development Block should be attached to each college with its technical control vested in the Principal of the college.
9. Increased demand for graduates should be met by expanding existing colleges. New colleges may only be developed as part of agricultural universities or where it is established that existing colleges will not meet specific needs.
10. In order to accord animal husbandry the status recommended for it elsewhere in this report, it should be organized as a separate section/department of a college.
11. Where there is an agricultural and a veterinary college on the same campus, one animal husbandry section/department should serve the needs of both colleges.
12. Present disparity in entrance requirements and duration of courses should be removed. Entrance requirements and course duration should be more uniform.
13. The Team recommends that collegiate courses should be so modelled as to permit the introduction of electives in the last two years of the course based on the aptitude of the candidates and to meet the diverse needs of the country for trained personnel in the varied fields of activity.
14. Some of the private agricultural colleges have inadequate staff and lack facilities such as farm equipment and buildings. It is desirable that these agricultural colleges be brought to the same level as the Government agricultural colleges.
15. It is recommended that the States concerned set up a Board consisting of representatives of the I.C.A.R., Department of Agriculture of the State, and the concerned universities to inspect private agricultural colleges and to make recommendations how they may be improved.

16. It is further recommended that no recognition should be given to new agricultural colleges unless they conform with the minimum requirements laid down by the I.C.A.R.

17. The curricula of agricultural colleges should be so adjusted as to give due importance to courses in soil and water management and agricultural economics, including farm management.

Separate model farm on profitable business method with poultry, horticulture, and dairy units would be an advantage in convincing students of the value of the various scientific methods of agriculture advocated in the institution.

18. The Team recommends the establishment of at least one Home Science College in each State associated with the agricultural college or university.

Post-Graduate

19. The Team recommends that, before any college is allowed to develop post-graduate courses, a competent body of men appointed by the I.C.A.E. should examine the stature the college has achieved, competency of staff, and adequacy of facilities. Development of the post-graduate programme and the examination system should be modelled after the present I.A.R.I. pattern.

20. The Team recommends that the post-graduate educational system at the I.V.R.I. should be developed as early as possible on the pattern adopted at the I.A.R.I.

Agricultural University

21. There is widespread demand from many States for the establishment of agricultural universities. In some cases demands are being made without even understanding all the goals and objectives of the agricultural universities and without any awareness of the needs of such a university. The Team recommends that assistance to establish an agricultural university should not be granted unless there is adherence to basic principles such as (1) autonomous status, (2) location of Agricultural, Veterinary/Animal Husbandry, Home Science, Technological and Science Colleges on the same campus, (3) integration of teaching by offering courses in any of these institutions to provide a composite course and (4) integration of education, research and extension.

I.C.A.E.

22. The Team strongly recommends that the technical staff of the Indian Council of Agricultural Education should be strengthened in order to enable it to discharge its functions satisfactorily.

23. The Team recommends that the Indian Council of Agricultural Education follow up the recommendations of the teaching seminars to ensure their implementation.

General

24. The Team recommends that an agricultural education pattern with well-defined objectives, be developed to encompass agricultural teaching from the vocational (Manjri) school, the multi-purpose high schools on through the college and university. At the college level there should be complete integration of research, teaching and extension.

25. Agricultural institutions and organizations (teaching, research or extension) can function with maximum effect only if directed by administrators who have an agricultural background. To ensure this, the Team recommends that men with scientific qualifications should be in administrative control of teaching, research and extension organizations.

26. The Team recommends that, where necessary, there should be established teacher training departments in conjunction with agricultural colleges. Selected technical men should be trained in administration in order to provide adequate number of technical men to fill administrative posts in agriculture.

27. The Team was gratified to note the action taken by the I.C.A.R. to prepare some of the text books for undergraduate students. The Team recommends that this work should be extended to include textbooks, reference books, laboratory and field manuals to suit vocational agricultural schools, multi-purpose high schools and extension training centres. Adequate incentives should be given to selected personnel to prepare such textbooks.

28. Further adjustments should be made in the examination system. The ultimate goal should be to replace external examinations with internal examinations.

Research

29. The overall agricultural research programme in India should be substantially enlarged in specialists and facilities to cope with India's enormous problem of increased agricultural production.
30. Major problems should determine India's agricultural research policy. To identify these problems, to establish priorities, and to determine means of implementing a research programme geared to solve these problems, an Agricultural Research Policy Council should be formed. This Council should be comprised of high level agricultural technical officers and serve as a standing Advisory Committee to the Governing Body of the Indian Council of Agricultural Research. With the establishment of this high level body the Board of Research should be abolished.
31. Coordination of all agricultural research programmes should be strengthened. It is recommended that the Indian Council of Agricultural Research, founded as the coordinating body, should effectively assume this role. Necessary organizational changes should be adopted some of which are listed below.
32. It is recommended that all the Central Research Institutes be brought under the full technical and administrative control of the I.C.A.R.
33. It is recommended that all the Commodity Committees including the Central Sugarcane Committee be brought under the full technical and administrative control of the I.C.A.R.
34. Strengthening the technical staff of the Indian Council of Agricultural Research should be given high priority. Effective coordination can be provided by this body only through the establishment of staff specialist posts in the major research fields, as enumerated by the First Indo-American Team.
35. The designation of project coordinators for appropriately grouped segments of research should be extended. Lines of responsibility should be clarified.
36. The Indian Council of Agricultural Research should sponsor only major projects of regional or national significance and cross-commodity research projects. Local research should be the responsibility of the States.

37. To ensure the States' capability to assume responsibility for research, it is recommended that the Government of India make available to the Indian Council of Agricultural Research a substantial allotment of funds in the Third Five Year Plan to be expended on the basis of a careful assessment of the needs of each State by the Agricultural Research Policy Council.
38. All of the agricultural research programmes within a State should be coordinated by setting up strong State Research Boards. The responsibility for coordination of research at the State level should be assigned to a Joint Director of Agriculture (Research) who should be the Principal of the dominant Government Agricultural College.
39. Agro-climatic areas should be demarcated and one major regional station established in each area. Each of these stations should function under the central coordinating authority of the State in which it is located. In the interests of minimizing dispersal of facilities and personnel, whenever practicable, branch, State and Central stations in the area should be combined with the regional stations.
40. All branch and regional stations of Central Research Institutes and Commodity Committees should be combined and fully integrated with State stations wherever practicable. All personnel of these agencies at such stations should be under the administrative control of the State, with selection, promotion and technical control retained by the parent agency.
41. Gaps in coverage of agricultural research by current programmes should be given particular scrutiny with a view to bridging them. In certain deficient fields, such as fundamental research in soil and water conservation, horticulture and plantation crops, and others, consideration should be given to strengthening research by the establishment of centrally financed, well-equipped research institutes.
42. In the major food grain crop areas for which research resources are inadequate, such as rice, wheat and pulses, it is recommended that additional funds be appropriated and earmarked for intensification of research on these crops, thereby releasing current resources of Indian Council of Agricultural Research for other crops and fields which have not received adequate attention.

43. In the interest of improving the quality of agricultural research, measures should be adopted to increase the incentives, morale and scientific integrity of agricultural research scientists. Permanency of posts, promotions on the basis of research competence, incentive awards and recognitions, salary scales comparable with other services, and other pertinent factors should be given due consideration and corrective measures implemented.

44. In the interest of providing a basis for the improvement of mutual understanding and harmonious working relations between State and Centre personnel at the regional research centres and sub-stations of the Central Research Institutes, it is recommended that appropriate Memoranda of Understanding, defining specific responsibilities and relationships of the participating agencies and personnel, be developed by the cooperating agencies. Provisions of such memoranda should be made known to all participating scientists.

45. More effective liaison should be developed between the I.C.A.R. and the Botanical and Zoological Surveys of India and other organizations whose work has a bearing on agricultural research.

46. More effective coordination should be brought about between Irrigation and Agriculture Departments both in the States and Centre in order to make irrigation and drainage research more fruitful and to utilize the irrigation potentials to the maximum.

47. Information collected in the I.C.A.R., Central Project Files should be made available freely to all research workers throughout India.

Extension

48. This Team recommends that the organization of agriculture and community development be streamlined from the Central Government down to the village level. This streamlining can be achieved if an organization on the following pattern is set up.

At the Centre, there should be a Minister for Agriculture, Community Development (Extension) and Food, who may be assisted by Minister/Deputy Ministers, in charge of Agriculture, Community Development (Extension) and Food. This implies that the Extension Wing of the Ministry of Food and Agriculture would merge with the present set up of the Ministry of Community Development. At the State level, the

Minister in charge of Community Development should also be the Minister for Agriculture, Animal Husbandry, Panchayats and Cooperation. He may be assisted by Deputy Ministers for each of these subjects. The Development Commissioner should be the Secretary of the Departments of Agriculture, Animal Husbandry, Cooperation and Panchayats. Agriculture and Animal Husbandry should provide the techniques, Panchayats the organization, and Cooperation the finance. It is necessary that all these three must be linked up effectively. The Development Commissioner should be assisted by Additional Secretaries, who may be Directors of Agriculture, Animal Husbandry and Veterinary, Cooperation and Panchayats.

49. Agricultural and Home Science Colleges should undertake as rapidly as their personnel and facilities permit the full responsibilities for all in-service training of Extension Workers including the Village Level Workers, Gram Sevikas, and Block staff personnel. During the Third Five Year Plan, the initial training of most VLWs and Gram Sevikas should be continued at the Extension Training Centres, as at present.

50. All agricultural, Veterinary Science and Animal Husbandry Colleges should develop a section to teach extension methods to their undergraduates. To these colleges and also the Home Science institutions, there should be attached one Community Development Block for practical training purposes.

51. A start should be made to provide agricultural subject matter specialists at the district and block level based on the particular needs of the area.

52. The Team recognizes that few agricultural colleges are now equipped to assume direct responsibility for extension work. The aim should be to build up extension activities at educational institutions so that ultimately this responsibility may be transferred from State Agricultural Departments to Agricultural Colleges and rural universities.

53. The Team recommends that the supply of extension information material in the local languages be increased and provided from the agricultural colleges rather than from the headquarters of the administering department. An information unit and press should therefore be located in the State agricultural colleges so that research information will be readily available to extension workers.

54. Duplication of and conflict between information materials supplied to the cultivator should be avoided. To achieve this, extension agencies of the Centre and the States should coordinate their information activities and clearly delineate their respective responsibilities and areas of work.

55. The First Team recommended that research, education and extension agencies should not be involved in rendering of agricultural services such as the increase and distribution of improved seed, the distribution of fertilizers, artificial insemination services, or similar activities of a service nature. This Team endorses that recommendation.

56. In order to carry out the decision for the VLW to devote 80 per cent of his time for agriculture, certain of his present duties must be assigned to others or postponed during the emergency. The block budgets should be readjusted accordingly to meet this objective.

57. Provision should be made for VLWs to continue their education at the colleges. Encouragement should be provided through scholarship aid and continuation of salaries while on study leave. The selection of these VLWs should be made on the basis of their record of work, as well as on their scholastic qualifications.

Inter-University Contract Programme

58. The Inter-University Contract Programme should be continued at least through the Third Five Year Plan of the Government of India. It will be important in the years immediately ahead to follow through with technical assistance to specific projects.

59. Technical assistance should largely be concentrated in fewer colleges with special emphasis on those institutions which are likely to develop into agricultural universities.

60. A separate contract should be entered into with one American University to furnish technical assistance to colleges of veterinary medicine.

61. Technicians should participate with their Indian counterparts in conducting seminars and strengthening undergraduate and post-graduate teaching programmes wherever it is feasible to do so. They should not be used to fill vacant teaching posts, nor to meet the qualification requirements of the affiliated university to qualify a department or section to offer post-graduate work.

62. Participants should be selected on the basis of merit not seniority; and they should be under 45 years of age.

63. The length of training period approved for a participant should be governed by the needs of both the participant and his college. Undue stress should not be given to programmes leading to advanced degrees. In general, the training period should be for one year, though a longer period may be allowed in meritorious cases. Only rarely should short tours abroad be approved and then only when such assignments contribute directly to the objectives of the Contract Programme.

64. The contracting universities should schedule seminars or provide other appropriate means of fully acquainting participants with the organization, function and working relations of agricultural colleges in the United States. Mere training in specialized fields such as agronomy, veterinary medicine, or agricultural economics is not enough for meeting India's problems. Participants should understand the integration of research, teaching and extension, state federal relationships, and numerous other aspects of American institutions that have made them so effective.

65. Funds should be provided for maintaining relationships with and giving assistance to returned participants. Arrangements for such liaison might well be extended to include all Indians who have had agricultural training in the United States.

66. In the allocation of funds for the purchase of commodities special consideration should be given to the needs of technicians and participants in order to further the objectives of the Inter-University Contract Programme.

67. All T.C.M. equipment supplied through I.C.A.R. for the research and teaching purposes should be exempt from customs duties.

Appendix IA Minute of Dissent

The Team in its chapter on "Extension" has referred to what it has described as "confusion" in the minds of many relating to the purpose, objective and function of extension work in India". This appears to be based on an incomplete understanding of Community Development and incorrect appreciation particularly in the context of Panchayat Raj. It has also arisen because the Team has tended to identify extension work in the limited field of agricultural extension with increase in agricultural production as not only the primary but the sole duty of the extension organization. This is far from being the case and would, in my opinion, result in stultification of the agricultural production programmes and agricultural extension work itself if the recommendations of this Team, as proposed, were to be accepted. It is necessary to go back to the circumstances which have led to the creation of Community Development and Extension Organization leading to their growth as at present. It is most important to refer to the recommendations of the Grow More Food Enquiry Committee of 1952 and in particular to Chapter VI. The Committee had said that the Grow More Food Campaign as had been conducted till that date had not fully achieved the results expected of it, broadly speaking, because its scope as conceived was too narrow and restricted. At the commencement, it was placed before the country as a campaign for achieving self-sufficiency in foodgrains. It went on to describe that the experience of the working of the Grow More Food Campaign led to the conclusion that a programme of integrated production could not stand by itself and had to be linked with carefully thought-out long term plans for village development as a whole which have to take into account the problem of raising the level of rural life, and making it fuller and richer. It was primarily a difficult human problem as the task was to create among the 60 million families in the villages a burning desire to change their old time outlook and arouse enthusiasm in them for new knowledge and new ways of life and a will to live better. The second change related to the linking up of the different departments of Government responsible for developmental activities and recommended that instead of working independently, as was the position till then, they should work in an integrated manner through a common development officer and a common village functionary.

These recommendations were endorsed at a conference of State Ministers of Agriculture & Cooperation held at New Delhi from the 24th to 28th September, 1953, vide recommendations 2 and 3 on subject No.1. Both had stressed the fact that the message to the villager should not be conveyed through different staff of the different development departments but through a trained multipurpose village level worker and that the village level worker should not be administratively under the control of the different development departments.

The extension organization has grown up from these considerations. Its concept and ideology have been clearly expressed in various communications and addresses by the Prime Minister and the Deputy Chairman, Planning Commission, and all stress the integrated role of the extension organization and the multipurpose character of the village level worker. The subject was discussed at the National Conference of Community Development at Mysore in 1959 and there again the consensus of opinion was in favour of retaining the multipurpose character of the present movement. This was again endorsed at the meeting of the Central Committee held on 16th December, 1959.

As against this background, the Team has suggested changes in the set-up of the extension machinery on the ostensible ground that it has failed to help sufficiently in increasing agricultural production during the last few years. This, however, is not based on facts. As is recognized there has been during the last ten years a 31% increase in agricultural production in the country. At the same time repeated surveys held over the last four years by the National Sample Survey Organization indicate that production of foodgrains is 15 to 20% higher in the block areas as compared to the country as a whole. Obviously, therefore, there has been a substantial increase in agricultural production in the block areas and it cannot, therefore, be said that extension machinery, as at present, has not carried out the tasks allotted to it. It is true that the pace of agricultural production can be and should be increased, but this will follow action on various fronts, for example, improvement in the system of education and research, increased supplies of fertilizers, research and distribution of better seeds together with improvement both in the extension techniques and quality and experience of extension personnel.

The Team has made certain recommendations regarding the amalgamation of Ministries and portfolios in the Central Government and distribution of portfolios and amalgamation of departments at the State level among various Ministers. This, I submit, is clearly beyond the scope of the terms of reference

of this Team. The distribution of portfolios and creation of Ministries is the responsibility of the Prime Minister of India and the Chief Ministers of the States. I may further add that following from the point raised earlier, namely, that rural extension in India is an integrated approach to rural development with agricultural production having the greatest priority at the present moment, the Ministry of Community Development being a coordinating Ministry for all aspects of rural life and having to deal with various subject-matter Ministries cannot be a department of only one subject-matter Ministry. The distribution of work suggested in the States would place too heavy a load on the Minister and the Secretary for anyone individual to bear.

(Sd) Ibrac Ali
21.5.1960

Appendix IISupplementary note by Indian members

The minute of dissent in Appendix I was presented at the last meeting of the Team, long after the American members had left this country. We, the Indian members, regret that a controversy has been raised by one of our colleagues over points, on which both facts and our needs should have left no scope for any divergence of views.

Many reports of assessment as those of the U.N., Ford Foundation Team, and Programme Evaluation Organization have left no doubt in our minds that the community development programmes have been basically weak in respect of economic activity on which the fabric of rural development rests. If agriculture has to be the dominant feature of the task of Village Level Worker, as has been recognized recently by the Ministry of Community Development, it is only logical that the control and regulation of his activities should rest with the Agriculture Department, and that this organic relationship should extend all along the line from the Block to the Ministry level.

Under para 2 of the Resolution of the Government of India (Appendix III), this Team is required to:

- i) evaluate the progress of work pertaining to Agricultural Education, Research and Extension during the past five years,
- and ii) develop supplementary recommendations with regard to Agricultural Education, Research and Extension with special reference to to the Third Five Year Plan.

We are convinced that the recommendations we have made are within the terms of our reference, and if implemented will materially improve the impact of agricultural extension work on agricultural production.

We think it is not necessary for us to analyse the contributory factors for the recent increase in agricultural production. So long as the stark reality of food shortage remains, neither inter-ministerial considerations nor traditional administrative set-up should be allowed to influence the vital needs of the country. Actuated by these considerations the Team has endeavoured to lay stress on the defects of the

existing administrative organization which permits the responsibilities of food production to be divided among more than one Ministry and Department at the Centre as well as in the States. Based on the exigencies of the administrative situation or local pressures, the VLW too is required to vary the stress on different aspects of the rural programme at the expense of extension work in agriculture.

We are, therefore, convinced that in dealing with the food problem which has been agitating the mind of the nation for so long, a bold and imaginative approach is needed and we feel evermore convinced, therefore, that the Team's recommendations should stand inviolate.

Appendix IIIGovernment of India Resolution Constituting the Team

No. F.1(7)/58-Edn I
Ministry of Food & Agriculture
(Department of Agriculture)
(I.C.A.R.)

New Delhi, dated the 12th September, 1959
21st Bhadra, 1881

R e s o l u t i o n

Appointment of a Second Joint Indo-American Team
on Agricultural Education, Research and Extension

A Joint Indo-American Team was appointed by the Government of India in November, 1954, to suggest measures for the improvement of existing facilities in the field of Agricultural Education and Research in the country. This Team submitted its report to the Government in September, 1955. Most of the recommendations made by the Team were accepted by the Government and steps have been taken to implement them to the extent funds are available during the Second Five Year Plan.

2. The work of formulating the proposals for the Third Five Year Plan is now in progress and it would greatly assist in the formulation of the Plan if a Team consisting of top scientists in the line is appointed to make a comprehensive review of the work in the field of Agricultural Education, Research and Extension. It has accordingly been decided to appoint a Second Joint Indo-American Team with the following terms of reference:-

- 1) To evaluate the progress of work pertaining to Agricultural Education, Research and Extension during the past five years.
- ii) To develop supplementary recommendations with regard to Agricultural Education, Research and Extension with special reference to the Third Five Year Plan.

- iii) To review the sisterhood arrangements concluded in 1955 with the five Land-Grant Universities of the U.S.A. under the Indo-US Technical Cooperation Programme with a view to find out to what extent they have helped in the development of Agricultural Education, Research and Extension programmes in the country and whether they should be continued during the Third Five Year Plan.

(Note:- The term 'Agriculture' is used in the broad sense and includes Animal Husbandry, Veterinary Science and other allied subjects.)

3. The composition of the Team will be as follows;

- 1) Dr M.S. Randhawa, D.Sc., I.C.S., .. Chairman
Vice-President,
Indian Council of Agricultural Research
and Additional Secretary to the Government
of India, Ministry of Food & Agriculture
- 2) Agricultural Commissioner with the
Government of India
- 3) Shri Lakshmi Sahay,
Animal Husbandry Commissioner with the
Government of India
- 4) Dr B.N. Uppal,
Chairman,
Expert Committee on Location and
Reclamation of Waste Lands,
Ministry of Food & Agriculture
(Department of Agriculture)
- 5) One representative of the Ministry
of Community Development and Cooperation
- 6) Shri Lal Singh,
Representative of the Committee on
Plan Projects, Planning Commission
- 7) Shri P.D. Nair,
Agricultural Adviser to the
Government of Kerala

- 8) Dr M.D. Patel,
Director,
Institute of Agriculture,
Lanand
- 9) - 11) Three representatives of high standing
and responsibility from the American
Land-Grant Universities with experience
of Agricultural Education, Research and
Extension
- 12) One representative of the U.S.
Department of Agriculture
- 13) Dr K.C. Naik, ... Secretary
Chief of Agricultural Education,
Indian Council of Agricultural Research

4. The Team is expected to commence its studies in October, 1959, and to complete its work by the end of January, 1960.

Sd.
K.R. Danle
Secretary to the Government of India

Appendix IVThe places visited and the officials met in India by the TeamPlaces visitedOfficials metDelhi

Ministry of Food &
Agriculture, Krishi
Bhavan, New Delhi

Shri M.V. Krishnappa, Deputy Minister
for Agriculture

Shri K.R. Datta, I.C.S., Secretary,
Department of Agriculture, Ministry
of Food & Agriculture, Government of
India

Indian Agricultural
Research Institute

Dr B.P. Pal, Director, I.A.R.I.

Dr R.S. Vasudeva, Joint Director and
Head of the Division of Mycology &
Plant Pathology

Dr E.S. Narayanan, Head of the Division
of Entomology

Dr S.P. Raychaudhuri, Chief Soil Survey
Officer.

Dr R.V. Tamhane, Head of the Division of
Chemistry

Dr E.G.K. Rao, Head of the Division of
Agricultural Engineering

Dr A.B. Joshi, Head of the Division of
Botany

Dr B.S. Randhawa, Incharge of Horticultural
Division

Dr O.P. Gautam, Professor of Agronomy
representing Head of the Division of
Agronomy

Extension Commissioner
to the Government of
India

Shri J.V.A. Nehemiah

Simla
Himachal Pradesh

Shri Raj Kumar, I.A.S., Secretary,
Department of Agriculture,
Himachal Pradesh

Dr L.S. Negi, Director of Agriculture,
Himachal Pradesh

Shri G.C. Negi, Deputy Director of
Animal Husbandry, Himachal Pradesh

Regional Fruit)
Research Station)
Mashobra)

Shri Sukh Raj Sablok, D.D.A. (Extension)

Shri Prem Sagar, D.D.A. (Hqra.)

Entomological and)
Mycological Labora-)
tories, Mashobra)

Shri B.S. Jhina, Agricultural Marketing
Officer, Himachal Pradesh

Shri N.R. Kaura, Horticultural Officer

Central Potato
Research Institute

Shri B.H. Patil, Potato Development
Officer

Shri S.R. Upadhaya, Agricultural
Information Officer

Shri J.C. Seam,
Plant Protection Officer

Dr Pushkar Nath, Director

Punjab
Chandigarh

Dr R.E. Cray, Group Leader,
New Secretariat

Dr G.A. Hummon, Regional Agricultural
Extension Training Adviser

Dr H.R. Capner, Rural Sociologist,
Agricultural College, Ludhiana

Shri K.S. Narang, I.A.S., Secretary,
Agricultural Department, Punjab

Dr Arjan Singh, Director of Agriculture,
Punjab

Shri S.S. Bedi, Deputy Secretary (Agri)

Shri Pritam Singh, Joint Director (Ext.)

Agricultural College,
Ludhiana

Dr S.S. Purewal, Principal,
College of Agriculture, Ludhiana

Dr J.S. Kanwar, Agricultural Chemist

Shri J.R. Bhambota, Horticulturist

Dr G.S. Sidhu, State Biochemist

Shri J.L. Dala, Groundnut Botanist

Shri P.A. Adlakha, Professor of Botany

Shri S.K. Paul, Agricultural Engineer
(Implements)

Shri D.S. Athwal, Economic Botanist
(Millets)

Shri Ajaib Singh, Deputy Director of
Agriculture (Research and Extension)

Shri Gursham Singh, Economic Botanist
(Cotton, Millets and Oilseeds)

Dr Sardar Singh, Entomologist

Shri Gurcharan Singh, Economic Botanist
(Cereals and Pulses)

Shri Mohindar Singh Pannun,
Professor of Agronomy

Shri K. Kirpal Singh, Fruit Specialist,
Punjab, Patiala

Shri Kharak Singh Mann, Agricultural
Development Officer, Ludhiana

Shri Bishan Singh Samundri,
Professor of Extension

Shri Sukhdev Singh,
Economic Botanist, Jullundhur

Shri Raghbir Singh,
Lecturer in Evaluation

Mathura

College of Veterinary
Science.

Dr. W. D. Buddemeier, Group Leader,
Region I, Agriculture College, Kanpur

Dr. C.V.G. Chowdhury, Principal and
Professor of Surgery.

Dr. S. K. Talpatra, Professor of
Animal Nutrition.

Shri A. Roy, Professor of Physiology.

Shri C.M. Singh, Professor of Pathology.

Shri M.P. Johari, Professor of Gynecology
and Reproduction.

Shri B.P. Pande, Professor of Parasitology.

Shri B. S. Singh, Professor of Medicine.

Shri P.L. Nag, Research Officer, Brucellosis.

Rudrapur

Rural Agricultural
University

Dr. R.E. Fisher, Livestock Marketing
Adviser, T.C.M.

Dr. H. W. Hannah, TCM Adviser

Mr. K.A.P. Stevenson, I.A.S, Administrator,
Rural University, Rudrapur.

Shri Ram Krishan, Liaison Officer,
U.P. Government.

General Manager of Tarai State Farm

Shri P. G. Pande, Director

Dr. P. Bhattacharya, Head of the Div. of
Genetics and Joint Director.

Dr. N.D. Kher, Principal, Post-Graduate ^{College}
of Veterinary Education.

Dr. N. Mahadevan, Head of the Div. of
Animal Nutrition.

Dr. H.D. Srivatsava, Head of the Div.
of Parasitology.

Izatnagar

Indian Veterinary
Research Institute

Dr. S. Bose, Research Officer, Farm.

Shri C. Sotha Raman, Head of the Div.
of Biological Products.

Shri R. N. Saxena, Registrar

Shri M.R. Dhanda, Head of the Div. of
Pathology and Bacteriology.

Dr. I.D. Wilson, Adviser on Post-Graduate
Education.

Dr. R.E. Fisher, Livestock Marketing
Adviser, T.C.M.

Lucknow
Residence of Minister
of Agriculture

Shri Mohan Lal Gautam, Minister for
Agriculture and Cooperation

Shri V. Verma, Dy. Minister for Cooperation.

Dr. B.K. Mukherjee, Dir. of Agriculture.

Dr. P. Mathur, Joint Dir. of Agriculture.

Shri Satish Chaudhery, I.C.S.,
Development Commissioner.

Shri R.K. Talwar, I.A.S., Secretary (Agr.)

Shri H.B. Shami, Animal Husbandry
Commissioner.

The Secretary for Cooperation.

Dr. R.K. Tandon, Principal, College of
Agriculture.

Shri Ram Krishen, Dy. Develop. Commissioner

Shri H. K. Lal, Dy. Dir. of Ann. Husbandry.

Shri G.P. Kapur, Dy. Commissioner

Shri K.P. Srivastava

Chinsura
Rice & Banana
Research Station

Dr. S.K.Mukherjee)	
Shri G.P.Mitra)	
Dr. K. C. Bhan)	
Shri S.K.Ghosh)	
Shri B.N.Ghosh)	
Shri M.N.Basab)	Joint Director an
Shri M. P. Guha)	staff of West
Shri G.N.Das)	Bengal Govt.
Shri R.B.Choudhary)	Department of
Shri A.P.Paul)	Agriculture
Shri S.N.Banerjee)	
Shri D.K.Mukherjee)	
Shri A.C.Basu)	
Mrs. Shanti Ghosh)	
Shri J. R. Pal)	
Shri J.Chakravarty)	
Shri S.K.Mukherjee)	
Shri D.K.Saha)	
Shri N. C. Pal)	

Calcutta
West Bengal
Secretariat

Shri N.C.Ray, I.A.S., Secretary,
Department of Agriculture

Shri H.C.Choudhuri)	
Shri A.K.Pal)	
Shri S.C.Ray)	
Shri B.N.Banerjee)	Officers of the
Shri D. Basu)	West Bengal
Shri S.P.Bose)	Government
Shri S.Sen)	
Shri S.M.Sen)	
Shri C.K.Ray)	
Shri H.K.Nandi)	
Shri A.K.Mukherjee)	
Dr. D.M.Sen)	
Dr. Hugh Templeton)	

Calcutta
Great Eastern Hotel

Shri M.N.Phukan, I.A.S, Secretary,
Department of Agriculture, Assam.

Bhubaneswar
Veterinary College

Shri J. N. Das, Reader
Shri N. Patnaik, Reader
Shri K.N.Mahapatra, Reader
Shri Siba Kumar Mishra, Reader
Shri B.B.Mohanty, Reader
Shri J.N.Prusty, Reader
Shri Ananta Misra, Reader
Shri Ballav Narayan Patra, Principal

Bhubaneswar
Agriculture College

Shri P. D. Dixit, Principal,
Agricultural College,

and staff of the College.

Cuttack
Central Rice Research
Institute

Dr. R.H.Richharia, Director
Dr. M.V.Vachhani, Agronomist
Dr. S.Y.Padmanabhan, Mycologist
Shri P. Israel, Entomologist
Shri B. B. Misra, Geneticist & Botanist
Dr.C.T.Abichandani, Agri.Chemist.
Shri S. Sampath, Cytologist
Shri N.A.Parasuraman, Farm Supdt.
Shri W.T.Bhutany, Asst.Botanist
Dr.S.Govindaswamy, Asst.Botanist
Dr.N.K.Chakravarty, Res.Off.Plant Pathology
Shri I.C.Mahapatra, Res.Officer,Agronomy
Shri Y.S.Rao, Res.Officer, Entomology
Shri G.Vedamoorthy, Officer i/c Pilot project.
Shri Taneja, Agr. Engineer

Bhubaneswar
Meeting at the
Secretariat.

Shri Radha Nath Rath, Minister for
Agriculture
Shri V. Ramanathan, I.C.S.,
Chief Secretary
Shri A. Bandhōpandhay, Joint Secretary,
Development Department.
Shri G.C.Das, I.A.S., Under Secretary,
Community Development.
Shri G.C.Das, I.A.S., Secretary, Agr.
Shri G.S.Baswae, Director of Animal
Husbandry and Vet. Deptt.
Shri A.L.Nayyar, Director of Agr.
Shri P.D.Dixit, Principal
Shri B.Misra, Dy.Dir.of Agr.

Hyderabad
Residence of the
Chief Minister,
Andhra Pradesh

Shri N. Sanjeeva Reddy, Chief Minister
Dr.G.Montgomery, Group leader, TCM
Dr.R.L.Donahue, TCM
Shri D.V.Reddy, Dir.of Agr.
Dr.P.M.N.Naidu, Dir.of Vet. Service
Dr.Mohd.Qadiruddin Khan, Jt.Dir.of Agr.

Hyderabad
Osmania University
Agricultural College

Dr. Hussain Ali Razvi, Principal
Shri R. Suryanarayana Rao)
Dr. T. M. Vithal Rao)
Dr. Mir Hamed Ali)
Dr. B. T. Karnani) Staff
Sri.K.S.Suryanarayana)
Shri T. Satyanarayanan)
Shri Ahmed Ullah)
Dr. G. Montgomery, Group leader, TCM

Hyderabad
Indian Central
Oilseeds Committee

Dr. R. Sankaran, Secretary

Hyderabad
Veterinary College

Shri C. V. Rao)
Shri M. Enamuddin)
Shri Mohd. Wali Ullah)
Shri V.N.Pargoanker) Principal and
Shri P.Srinivasan) staff of
Shri V.Ramachandra Rao) veterinary
Shri V.D.Sadekaf) college
Shri D. Bhim Reddy)
Shri R.S.Raghavan)
Shri V.Rayappa Reddy)

Hyderabad
Secretariat

Shri Thirima Reddy, Minister for Agr.
Shri Jagjivan Chand, I.A.S., Secretary
Shri Rai Prithviraj, Special Officer,
Rural University
Shri Viswanath Reddy, Dir.of Agr.
Shri S.S.A.Hashmy) Officers of the
Shri K. Devadanam) Department of Agr.
Shri M. Sriramulu) Animal Husbandry

Madras
Meeting with the Dir.
of Agr.in his office

Shri A. Venkatesan, I.A.S, Dir.of Agr.

Madras
Meeting with
Home Secretary

Shri P.P.I.Vaidyanathan, I.C.S, Home Secretary

Madras
Meeting with Secretary,
Agr. Department

Shri M.G.Rajaram, I.A.S., Secretary, Food
and Agriculture, Madras
Dr.S.Krishnamurthi, Dean of Agr., College
and Research Institute.
Shri C.R.Seshadri, Jt.Dir.of Agr.
Dr. A. Mariakulandai, Principal Agr.College

Tudialur

The Tudialur Cooperative Vice-President and some
Bank Ltd. members of the Bank.

Perianayakanpalayan
Rural Institute

Shri T.S.Avinashilingam Chettiar, M.P.
Dr. Aram, Principal)
Shri K. Kulandaivel)
Shri Vedantan) Principal and
Shri Chavana) the staff of the
Shri A.M.Nellayyan) Rural Institute
Shri G. Venkatesan)
Shri N. Krishnamurthy)
Shri N. Rajagopalan)
Shri S. Dorai)

Coimbatore

Central Sugarcane
Breeding Institute

Dr. Bhatt, Director and Heads of
Research Sections.

Coimbatore

Home Science College

Shri T.S.Avinashilingam Chettiar, M.P.
Dr.(Mrs.) Rajammal Devadass, Chief
Home Economist, New Delhi
Dr. Aram
Shri Kulandaivel
Staff members of the Home Science
college and students.

Coimbatore

Agricultural College

Shri M.G.Rajaram, I.A.S., Secretary, Agr.
Shri A. Venkatesan, I.A.S., Dir.of Agr.
Dr. S. Krishnamurthi, Dean, Agr.College
and Research Institute.
Dr. E. J. Long, Group leader, TQM
Dr. A. Mariakulandai, Principal, Agr.College

Bangalore

Veterinary College
Agricultural College
Science Laboratory

Dr. K. S. Shetty, Director of An.Husbandry
Dr.H.B.Arakeri, Jt.Dir.of Agriculture
Shri B.Venkoba Rao, Principal,
Hebbal Agr. College
Dr. R.S.Deshpande, Prof.of Mycology,
Dharwar Agr. College
Shri A. Anantapadmanabha Rao) members of
Shri R.R.Dwarakanath) the staff
Shri R. Ramanna)

Shri Mallaraj Urs)
 Shri T.V.Basavaraj)
 Shri B.V.Venkoba Rao)
 Shri S.R.Chandrasekhariah)
 Dr. G.C.Gonvindu)
 Shri T.C.Thirmiah)
 Shri Muddappa) Agriculture and
 Dr.D.K.Veeranarayan) Animal Husbandry
 Shri Rangaswamy) Departments.
 Shri J.Srinivasamurthy)
 Dr. M. Tutturudriah)
 Shri G.P.Chennabasavanna)
 Dr. G.A.Hardikar)
 Shri P.Satyendra Rao)
 Dr. R.D.Nanjiah)
 Dr. Syed Mohiduddin)

Dean McLeod, Extension Expert, c/o Agr.
 College, Hebbal, Bangalore
 Dr. E. J. Long, Group Leader, TCM
 Dr.M.B.Badenhop, Agr.Econ.Adv. TCM

Bangalore
 Office of the
 Director of Agr.

Dr. H. B. Arikere)
 Shri T. Srinivasamurthy)
 Shri M. Srikantiah) Officers of
 Prof. Deshpande) the Deptt.
 Dr. N.P.Patil) of Agriculture
 Shri N.B.Hiremath)

Bangalore

Dr. V. Subrahmanyam, Director,
 Central Food Technological Res.Institute

Trivandrum
 Vellayani
 Agricultural College

Shri Brito Muthunayagam)
 Shri K. Madhavan Nair)
 Shri C. M. George) Vice Principal
 Dr. T. C. Joseph) and staff of
 Shri P. K. Pillai) the agr.college
 Shri K. C. Mathew)
 Dr. N. Mones)
 Shri K.V. Joseph)
 Shri J. J. Purn)
 Shri K. Ramanath Menon)
 Shri R. Abraham)
 Shri P. M. Mathew, 18-S, *J. Director of Agricultural*
 Shri M.Janardhanan Nair, Jt.Dir.of Agr.
 Shri F.G.Kurup, Jt.Dir of Agr.

Trivandrum
Tuber-Crop Research
Station, Kerala University

Dr. Abraham, Prof. in-charge of the
Scheme at the University

Shri C. Thomas. (AS), Secretary, Agriculture.

Kavankulam
Central Coconut
Research Station

Dr. Menon, Director, Coconut
Research Station and his staff
Dr. P.S.Gregory, Secretary, Indian
Central Coconut Committee

Bombay
Secretariat

Shri V.P.Naik, Minister of Agr.
Shri P.C.Nayak, Under Secretary
Capt. S. P. Mohite, Dir. of Agr.
Dr. B.S.Kadam, Jt. Dir. of Agr.
Dr. Ghatge, Jt. Dir. of Agr.
Dr. V.G.Vaidya, Jt. Dir. of Agr.
Director of Animal Husbandry
Principal, Veterinary College
Dr. G.Montgomery, Group leader, TCM
Dr. P.N.Driver, Principal, Agr. College,
Poona

Bombay
Atomic Energy
Laboratory

Dr. Gopala Iyer and staff

Amaravati

Principal, Rural Institute

Appendix VQUESTIONNAIRE ISSUED TO STATE GOVERNMENTS

- 1) Mention below in the proforma the statistics relating to your State for the past 5 years in respect of each item:

[1954-55] [1955-56] [1956-57] [1957-58] [1958-59]

- i) Total cropped area in acres.
- ii) Total quantity of food produced
- iii) Total amount budgeted for the Dept. of Agr. as a whole. *
- iv) Total amount spent for the Dept. of Agr. as a whole. *
- v) Total amount budgeted for agricultural education only.*
- vi) Total amount spent for agricultural education only.*
- vii) Total amount budgeted for agricultural research only.*
- viii) Total amount spent for agricultural research only.*
- ix) Total amount budgeted for agricultural extension only.*
- x) Total amount spent for agricultural extension only.*
- xi) Total amount received from the Central Govt. (Including ICAR) for agricultural education only.*
- xii) Total amount received from the Central Govt. for agr. research only.*

- xiii) Total amount received from the Central Govt. for agricultural extension only.*
- xiv) Amount received for agricultural advancement from Government of India other than through the ICAR (Mention the purpose for which it is received).*
- xv) Total amount received from Commodity Committees (Mention the name of Commodity Committees from which funds were received).
- xvi) Total matching grant sanctioned by the State Government in respect of amount under xv).

* Similar figures may be given separately for veterinary and animal husbandry.

2. Are you satisfied with the present arrangement for receiving financial aid from the I.C.A.R., Government of India or the Central Commodity Committees? If not, state what in your view should be the specific field for receiving funds from the I.C.A.R., Government of India or Commodity Committees and in what proportions?
- i) For strengthening research at State level?
 - ii) For new short range projects?
 - iii) For new projects of permanent character?
 - iv) For coordinated inter-State projects on a short range basis?
 - v) For coordinated inter-State projects of permanent nature?
 - vi) For establishing independent research centres in the States to supplement the States' work?

Progress of work during the past five years

3. Do you think that the progress of work in the field of agricultural education, research and extension during the past five years has been satisfactory? Give reasons for the halting progress, if any, and suggest how the difficulty can be removed in each case.
4. If the progress has been satisfactory, can you suggest any further steps to make the progress more substantial?
5. Is the quality of work for (a) education, (b) research and (c) extension commensurate with the quantity? If not, what are the reasons for the disparity and what suggestions would you make to step up the quality in each field?
6. Has there been appreciable improvement in physical facilities for agricultural research and education in the past five years in the form of staff, laboratory accommodation, field space, equipments, etc.? If so, mention the main additions giving an idea of the cost incurred therefor.
7. How much of this development is due to:
 - a) Central assistance?
 - b) State assistance?
 - c) TCM assistance?
8. How many of your (a) Research Officers, (b) Extension Officers, (c) Teaching Staff, (d) Administration staff and (e) Students were sent abroad in the past 5 years? Mention the subjects or purposes for which they were sent.
9. How many of these were sent:
 - (i) Under T.C.M. Participants Programme?
 - (ii) Under Colombo Plan or other aids?
 - (iii) By Central Government out of its own funds?
 - (iv) By State Government out of its own funds?
 - (v) By private benefactors?
 - (vi) By students' or officers' own resources?
10. How many were sent for training in institutes within India?
 - (a) Within the State?
 - (b) Outside the State?

11. How many branches or sub-stations of the Central Institutes have been established in your State during the past five years? Mention them and their locations.
12. How many sub-stations or field experiment stations are there in your State to evaluate new crop varieties, fertilizer practices or other improvements? Are they located each in a distinctive region or tract? Are they too few or too many? Give your suggestions.
13. Are all those trained abroad and at post-graduate institutions in India at the Government expense provided for suitably to render more useful service in the lines in which they were trained? If this is not done, how can the position be remedied?
14. Periodic evaluation of competence and productivity of research workers and also of educational and extension workers was suggested by the First Team. Is this being done and if so how? If not, how should this be done in future?
15. Is the policy of direct recruitment to research, teaching and extension posts being pursued? If so, what is the proportion and what is its effect on quality and morale?
16. Do the heads of research and educational institutions enjoy adequate freedom to run their institutions according to the felt needs and accepted technical standards? What changes in administration would you suggest to ensure this freedom?
17. Are the opportunities for visits by research workers and teachers to centres or institutions of interest and to exchange ideas with workers in the same field adequate? What are your suggestions to improve the position?
18. Are the farmers' organization like the Farmers' Forum developed in your area or State adequately to be able to speak for the rural people and to make an impact on the educational, scientific and other development progress relating to agriculture? Give your suggestions, if any, for improving the position.
19. What are your comments on and experience of the working of the regional stations and PIRRCOM centres? What suggestions can you offer to make these function effectively and fruitfully?

20. Is the institution of project-coordinators' system working satisfactorily, Mention how this could be improved to make it an effective tool to upgrade research.
21. Who is the officer now charged with supervision and coordination of research and education in your State for agriculture? Has he under him technical staff in close touch with research and extension to be able to expedite transmission of new information and to bring to the scientific workers practical problems of the farmers?
22. Is a specialized course in agricultural education or extension methods offered in your agricultural colleges with facilities for work in the villages?
23. How many of the teachers in your Post-graduate Institutes themselves carry out significant research?
24. Are research opportunities provided for all members of the teaching staff in your Agricultural/Veterinary Colleges?
25. What is the ratio of teachers to students in your Agricultural/Veterinary Colleges?
26. What is the teaching load of a professor, a lecturer and teaching assistant and how does this compare with the hours spent on research? Give the particulars separately for Agricultural and Veterinary Colleges?
27. Is a Home Science College established alongside your Agricultural Colleges, as recorded by the First Team? If not, how do you propose to cater to the needs for teaching Home Science to women with a village background?
28. Has there been any evidence in the recent past towards greater standardization of curricula and of procedures for raising the educational standards of Agricultural and Veterinary Colleges? Give your specific suggestions to promote higher standards, having regard to the present position.
29. What in your opinion would be the influence of the new Agricultural Universities and Post-graduate Institutes such as those recently established at I.A.R.I. and to be established at Rudrapur, on the course of agricultural education in other colleges?

30. Are you satisfied that the products of Manjri schools turn out to be efficient practical farmers? Have you any suggestion to improve the standard of vocational agricultural education?
31. To promote the standard of scientific farming through education of the farming community in its broadest sense, what type of courses of training or education would you suggest and under what agency?
32. What is your impression of the products from Rural Institutes? Give your suggestions, if any, to make these Institutes fulfill their declared aim or to increase their utility.
33. Who is in direct charge of extension work in your State and what is his share of the responsibilities for extension work in N.E.S. and C.P.A. areas? What would you suggest to coordinate the entire extension work in a more efficient way?
34. Is the time of research staff being devoted to supervisory routine, administrative and similar activities that are of a non-scientific or non-technical nature? If so, what percentage of the working hours an officer in research (and also teaching sections) spends normally on such non-technical duties?
35. What is the proportion of time an extension worker has to spend on non-extension duties such as to enforce control or regulatory measures?

Suggestions for the future

36. How much money (1) per year and (2) for Third Plan period would you suggest to be provided by the
 - (i) I.C.A.R. and
 - (ii) each of the Commodity Committees
 for aiding your State/Institution to bring agricultural and veterinary research to the required level?
37. In the context of the scarcity of trained personnel to man new research projects, what suggestions have you to make now projects function smoothly and effectively?

38. Would you be prepared to take the staff on loan from other institutions for specified periods on deputation?
39. The First Team had suggested an additional appropriation of Rs. 10 crores to be allotted over a period of five years directly to the States as long-term continuing grants on the basis of proportion of the population, to be used by the States on their discretion. In the context of the existing conditions, what suggestions can you offer in modification of this recommendation?
40. To ensure that the Central subsidy given for a larger number of developmental schemes under the National Plan are utilized for the intended purposes, according to schedules and targets laid down and to iron out bottlenecks, the first Team had suggested the posting of advisers on regional basis. What are your remarks on the need for and the functions of such officers?
41. The First Team had suggested that the Chief of Advisory and Information Services should serve as the principal liaison officer between the I.C.A.R. and other extension and development organizations. Now that a separate extension directorate is working independently of the I.C.A.R. what changes would you suggest to bring about this liaison?
42. The First Team had suggested that the Central Institutes should be the executive arms of the I.C.A.R. so that the work of these institutes may be effectively coordinated and brought into close partnership with the research carried out in the States? What is the present relation between the States vis-a-vis these Central Institutes or their sub-stations and how far do these supplement the work done in the States? How can a close partnership envisaged by the First Team be ensured under the present context?
43. Is there any need for a post-graduate college of agriculture or veterinary science in your State? If so, justify the need for it, explaining why the existing or proposed Post-graduate Institutes cannot meet the needs of your State?
44. What suggestions have you to offer to make the Indian Journal of Agricultural and Veterinary Education more useful?
45. What suggestions can you offer to expedite the acceptance and implementation of the recommendations developed by the I.C.A.E. by the Universities?

46. Which are the suitable centres for establishing in your view more agricultural or rural Universities?
47. The Chief of Advisory and Information Services in the I.C.A.R. was to be the liaison officer in the matter of storage, marketing or related agricultural fields. Do you think any such liaison arrangement exists now when the marketing, grading and enforcement of fruit production control order are vested with the Directorate of Marketing? Give your suggestions to improve the position, if there is need for any improvement.
48. What are your suggestions to make the publications of I.C.A.R. more popular?
49. Which of the recommendations of the Nalagadh Committee, that are still to be implemented, needs to be given high priority for implementation in the present context?
50. What suggestions have you to offer in regard to the utilization of the assistance of U.S. Technicians present in India under the Indo-US Technical Cooperation programme?
51. What are the lines in which the above programme requires to be altered, in the event of its continuation? Give your specific suggestions on (1) the participant programme, (2) supply of equipment and books and (3) grant of aid in other forms.
52. What provisions have you made for (1) Agricultural Education, (2) Agricultural Research (3) Agricultural Extension in the draft Third Plan? Mention the provision under each item.

Appendix VI

Commodity CommitteesQuestionnaire issued to Commodity Committees

1. Mention below in proforma the statistics relation to your Committee for the past 5 years in respect of each item:

1954-55 1955-56 1956-57 1957-58 1958-59

- i) Total receipts
 - ii) Total amount spent
 - iii) Total amount budgeted and spent for research only
 - iv) Total amount budgeted and spent for education only
 - v) Total amount budgeted and spent for extension (including seed multiplication) only
 - vi) Total amount budgeted and spent on research on inter-commodity such as PIRRCOM
 - vii) Total amount budgeted and spent on research directly carried out by the Committee through its central station
 - viii) Total amount budgeted and spent on research directly carried out by the Committee through regional or sub-stations or other centres.
2. Are you satisfied with the present arrangement for financing research, educational or extension schemes or projects? If not, what in your opinion should be specific changes needed?

3. Give a very brief note, not exceeding about 1,000 words the over all but specific achievements through research, teaching and extension work carried out during the past 5 years in
 - (a) Your central station
 - (b) Your regional or sub-stations directly controlled by the Committee
 - (c) Centres or projects jointly financed by your Committee and the State Governments
 - (d) Centres or projects financed by your Committee and other Commodity Committees
4. What specific suggestions have you to offer to
 - (i) improve the output of research in quality and quantity?
 - (ii) improve the educational aspect of the Committee's activities?
 - (iii) improve the output and effect of the extension work done by your Committee with or without collaboration with other agencies?
5. Has there been any assistance obtained by your Committee under the Indo-US Technical Cooperation programme or other outside bodies in the form of help or advice from Technicians, funds, equipments, books, participants on foreign training, etc?
6. Have you any suggestions to offer to secure such help in future?
7. How many research centres or projects were sanctioned in each of the past 5 years by your Committee and what was the total cost of those in each year?
8. How many extension projects were sanctioned in each of the past 5 years and what was the total cost of these?
9. How many educational or teaching projects were sanctioned in the same period and what was the cost?

10. How many persons were deputed for training abroad or in institutions in India by the Committee and what was the cost in each of the past 5 years?
11. How many were sent on similar purposes with the help of other aids such as T.C.M. or Colombo Plan in the same period?
12. Is there a periodical evaluation of research, extension and teaching programmes and if so, how often it was done and with what results?
13. Do you think these evaluations are useful or have you any suggestions to improve the current methods ?
14. What provision exists for your research personnel to collaborate with the work of other research or extension organizations and how can that be improved upon?
15. What is the policy of recruitment to research, extension and other staff and in what manner can this be improved upon?
16. Do the heads of research and educational institutions enjoy adequate freedom to run their institutions according to the felt needs and accepted technical standards? What changes in administration would you suggest to ensure this freedom?
17. Are the opportunities for visits by research workers and teachers to centres or institutions of interest and to exchange ideas with workers in the same field adequate? What are your suggestions to improve the position?
18. Are the farmers' organizations like the Farmers' Forum developed in your area adequately to be able to speak for the rural people and to make an impact on the educational, scientific and other development progress relating to agriculture? Give your suggestions, if any, for improving the position.
19. What are your comments on and experience of the working of the regional stations and PIRRCOM centres? What suggestions can you offer to make these function effectively and fruitfully?

20. Is the time of research staff being devoted to supervisory, routine, administrative and similar activities that are of a non-scientific or non-technical nature? If so, what percentage of the working hours an officer in research (and also teaching sections) spends normally on such non-technical duties?
21. How much money have you suggested for the Third Plan to be provided for
- (i) Research
 - (ii) Extension and
 - (iii) teaching
- purposes?

Appendix VII

Questionnaire issued to Central Institutes established
by the Union Ministry of Food & Agriculture

1954-55 1955-56 1956-57 1957-58 1958-59

1. Total amount spent in
2. Total amount spent on research only
3. Total amount spent on extension only
4. Total amount spent on teaching programmes only
5. Total amount proposed to be spent during the Third Plan period
6. Are you satisfied with the present arrangement for financing research, educational or extension schemes or projects? If not, what in your opinion should be the specific changes needed?
7. Give in a very brief note, not exceeding 1,000 words, the overall but specific achievements through research, teaching and extension work carried out during the past 5 years in
 - (i) your central station and
 - (ii) your regional or sub-stations.
8. What specific suggestions have you to offer to
 - (i) improve the output of research in quality and quantity?
 - (ii) improve the output and effect of the extension work done by your institute with or without collaboration with other agencies?
9. Has there been any assistance obtained by your institute under the Indo-US Technical Cooperation programme or other outside bodies in the form of help or advice from Technicians, funds, equipments, books, participants on foreign training, etc.

10. Have you any suggestions to offer to secure such help in future?
11. How many persons were deputed for training abroad or in institutions in India by the Institute and what was the cost in each of the past five years?
12. How many persons were sent on similar purposes with the help of other aids such as T.C.M. or Colombo Plan in the same period?
13. Is there a periodic evaluation of research, extension and teaching programmes and if so, how often it was done and with what results?
14. Do you think these evaluations are useful or have you any suggestions to improve the current methods?
15. What provision exists for your research personnel to collaborate with the work of other research or extension organizations and how can that be improved upon?
16. Are the opportunities for visits by research workers and teachers to centres or institutions of interest and to exchange ideas with workers in the same field adequate? What are your suggestions to improve the position?
17. Are the farmers' organizations like the Farmers' Forum developed in your area adequately to be able to speak for the rural people and to make an impact on the educational, scientific and other development progress relating to agriculture? Give your suggestions, if any, for improving the position.
18. How many regional stations have been established and what are their respective aims?
19. What are your comments on and experience of the working of the regional stations? What suggestions can you offer to make these function effectively and fruitfully?
20. Is the time of research staff being devoted to supervisory, routine, administrative and similar activities that are of a non-scientific or non-technical nature? If so, what percentage of the working hours an officer in research (and also in teaching sections) spends normally on such non-technical duties?
21. How much money have you suggested for Third Plan to be provided for (i) research (ii) extension (iii) teaching purposes?

Appendix VIIIBIO-DATA OF MEMBERS

1. Name Dr. Mahinder Singh Randhawa
- Position Vice-President, Indian Council of Agricultural Research and Additional Secretary to Government of India, Ministry of Food and Agriculture.
- Education Punjab University B.Sc. (Hons) 1929
M.Sc. 1930
D.Sc. 1958
Fellow, National Institute of Sciences of India
President, National Academy of Sciences of India
President, Botany Section, Indian Science Congress
President, Northern India Science Association.
President, Horticultural Society of India
- Travel in other countries U.K., Europe (Continent), Canada, U.S.A., Indonesia.
- Address 7, Timmuti Lane, New Delhi
2. Name Dr. Jashbhai Shankerbhai Patel
- Position Agricultural Commissioner with the Government of India, Indian Council of Agricultural Research, Ministry of Food & Agriculture, New Delhi.
- Education Cornell University, U.S.A. B.Sc. (Agri) 1927
" " " M.Sc. (Agri) 1928
Edinburgh University Ph.D. 1930
- Travel in other countries U.S.A. 1925-28, United Kingdom, Germany, France, Italy, Spain, and Hungary 1928-30.
- Address 125 CII Flat, Moti Bagh, New Delhi
3. Name Laxmi Sahai
- Position Animal Husbandry Commissioner with the Government of India, Indian Council of Agricultural Research, Ministry of Food and Agriculture, New Delhi.

- Education Agra University B.Sc. 1920-24.
 Allahabad University M.Sc.(Zoology) 1924-26
 Royal (Dick) Veterinary College,
 Edinburgh M.R.C.V.S. 1927-30
 Institute of Animal
 Pathology, Cambridge, and
 Royal Veterinary College, London, Bacteriology,
 1938-41.
- Travel in other countries United Kingdom 1927-30, 1938-41, 1955;
 U.S.A. 1955, France, Sweden, Denmark, Holland,
 Germany and Switzerland 1955
- Address 31 C/I Flat, Pandara Road, New Delhi
4. Name Dr. Badri Nath Uppal
- Position Chairman, Expert Committee on Location and
 Reclamation of Waste Lands, Ministry of Food
 and Agriculture (Department of Agriculture).
 Till recently Agricultural Commissioner with
 the Government of India.
- Education Iowa State College of Agriculture 1921-25,
 Ph.D. in Agricultural Botany, with specialisation
 in Bacteriology, Rothamsted Experimental Station
 (U.K.), University of Wisconsin, and Rockefeller
 Institute of Medical Research (U.S.A.) in Plant
 viruses, 1933-34.
- Travel in other countries U.S.A. 1921-25, 1933-34, 1955; United Kingdom
 and Sudan 1933-34; United Kingdom, France, Sweden,
 Denmark, Holland, Germany and Switzerland, 1955.
- Address 18, Humayun Road, New Delhi
5. Name Ibne Ali
- Position Deputy Adviser (Agriculture), Ministry of
 Community Development and Cooperation, Department
 of Community Development, New Delhi.
- Education Agra University, B.Sc.(Agr.)
 Extension Training in Illinois University, U.S.A.
 and British Ministry of Agriculture in U.K.
- Travel in other countries U.S.A and U.K.
- Address 'Nizam Manzil', Lakhimpur-Kheri, U.P., India

6. Name Sardar Lal Singh
- Position Representative of the Committee on Plan Projects, Planning Commission. Formerly Director of Agriculture, Punjab; Fruit Development Adviser to Government of India; Director, All India Food Technology Institute; Dean of Agriculture Faculty, Punjab University, and Member of Parliament; now vice-President, Indian Central Sugarcane Committee; Member, Irrigation and Power Team, Planning Commission; and Chairman, Evaluation Committee of Rajasthan Government for Agricultural Production.
- Education Graduate with Honours from California University securing Master's Degree in Food Technology in 1921 and elected to Sigma XI.
- Travel in other countries U.S.A., U.K., France, Italy, Switzerland, Palestine, Egypt, Japan, Indonesia, Singapore, and Australia.
- Address Farm at Anadapur via Jagadhri, Dist.Ambala.
7. Name P. D. Nair
- Position Formerly Principal Agricultural College, Nagpur; Director of Agriculture in Madhya Pradesh, Hyderabad and Kerala; now Agricultural Adviser to the Government of Kerala.
- Education L.Ag.(Hons), Post-graduate, Pusa, M.A.
- Travel in other countries U.K., France, Italy
- Address Odarasironani Road, Vellayambalam, Trivandrum, Kerala.
8. Name Dr. Maganbhai D. Patel
- Position Director, Agricultural Institute, Anand.
- Education Diploma in Agriculture (Poona College) 1927. M.Sc.(Cornell), Ph.D.(Wisconsin) 1931.

- Travel in other countries U.S.A., Great Britain, Norway, Sweden, Denmark, France, Belgium, Holland, Germany, Switzerland, Italy.
- Address Director, Institute of Agriculture, Anand.
9. Name Dr. Arthur D. Weber
- Position Dean of Agriculture, Kansas State University, Manhattan, Kansas, U.S.A.
- Travel in other countries Argentine, Brazil, Peru, Uruguay, Honduras, Guatemala, Canada, England, Spain, India (Member, the Agricultural Study Team, sponsored by the Ford Foundation).
- Education Kansas State University B.Sc.
Kansas State University M.Sc.
Purdue University Ph.D.
Purdue University D.Sc. (Honoris Causa).
- Address.Home: 321 South Delaware Ave., Manhattan, Kansas, U.S.A.
- Office Waters Hall, Kansas State University, Manhattan, Kansas, U.S.A.
10. Name Dr. A. L. Darlow
- Position Dean of Agriculture and Vice-President for Agricultural Sciences, Oklahoma State University.
- Education B.S. Oklahoma A & M College 1919
M.S. University of Wyoming 1923
Ph.D. University of Wisconsin 1942
- Travel in other countries 1945-46, 1952, 1954, 1955, 1956, 1957, British Isles and Europe, 1952 Ethiopia, 1958 Honduras, Ecuador and Canada.
- Address Stillwater, Oklahoma
11. Name Dr. Arthur L. Deering
- Position Dean, College of Agriculture, University of Maine, Director of Agriculture Research and of Education (Emeritus, Dean of Agriculture).

Education	B.S. University of Maine 1912 D.Sc. University of Maine 1933. LL.D.(Hon) University of Vermont 1957.
Travel in other countries	International Conference, Agricultural Economists, Scotland, 1936; International Conference, Agricultural Economists, Canada, 1939; U.S. Delegate to F.A.O. Conference, Quebec, Canada, 1945; Member, E.C.A. Working Teams -- all countries of Western Europe, 1950, Mutual Security Administration Consultant to Portugal, 1951, Member Joint Indo-American Team to India, 1959.
Address	Orono, Maine, U.S.A.
1	
12. Name	Dr. Martin G. Weiss
Position	Associate Director, Crops Division, Agricultural Research Service, U. S. Department of Agriculture.
Education	Iowa State College B.S. 1934 M.S. 1935 Ph.D. 1941 in Genetics and Plant Breeding.
Travel in other countries	Northern Europe, 1956 and 1957; Member, International Commission for Nomenclature of cultivated plants. 1958 - Pakistan, India, Thailand, Indonesia, Philippines - reviewing research potentialities to undertake research of mutual interest to U.S. and indigent countries on the basis of grants of IL.480 funds. 1944-45 - Europe - Artillery Battalion Commander with U.S.Army
Address	Plant Industry Station, Beltsville, Maryland.

13. Name Dr. Kullal Chickappu Naik

Position Chief of Agricultural Education, Indian Council of Agricultural Research, New Delhi. Previously Dean of Agricultural College and Research Institute, Coimbatore, and Additional Director of Agriculture, Madras.

Education B.Ag. Agricultural College, Poona, 1921-24.
M.Sc. - Horticultural Research Station, Long Ashton, Bristol University 1931, Ph.D. Bristol University, 1951.

Travel in other countries U.K. 1930-31, 1938, 1957; Germany 1938 as an Indian Delegate to XII International Horticultural Congress - Italy, U.S.A., Hawaii, Japan, Philippines and China 1957.

Address Chief of Agricultural Education, I.C.A.R., New Delhi.