DRAFT AGRICULTURAL DEVELOPMENT PLAN 1971–1977

AGRICULTURAL RESEARCH EDUCATION, EXTENSION AND TRAINING

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The Agricultural Development Proposals 1966—70 provided what may be considered the bare outlines of the research programme of the Department of Agriculture. The subjects of extension, education and training received no attention at all.

2. The present Plan which seeks to make commitments in the Agriculture sector for a 7 year period from 1971—77 and clarify perspectives for a period even after 1977 must face the area of agricultural research, extension, education and training in a comprehensive and fundamental manner. The attempts made here to pull together research, extension and education as an integrated area of work which provides the roof as it were to the diverse programmes and policies established in the succeeding chapters is a limited attempt at facing these questions in their totality.

AGRICULTURAL RESEARCH

3. The role that research and experimentation has played in industrial and agricultural development in advanced countries and the need for agriculture research and experimentation to be carried out under the specific soil and climatic conditions of each country are too well-known to need emphasis here. Nevertheless, in the context of Ceylon where agriculture is moving towards modernisation, the critical importance of locally conducted agricultural research oriented towards solving practical problems of farming cannot be overstated.

4. In the past agricultural research in this country has been oriented towards individual crops and disciplines. This approach may be a limiting factor in a situation where the isolated focus on separate crops and livestock projects is being abandoned in favour of developing farming systems which are economically and socially viable. This change of objective and focus in agricultural development places three inescapable criteria for the organisation of research during the period of the plan. The first is that research must move out of the traditional confines of fragmented disciplines and take an inter-disciplinary and problem-solving character. The second is that research must be organised on the basis of regional specialization based where possible on plans of regional development. And lastly, the research programmes must have clear short and long-term objectives.

5. Development planning in agriculture needs the support of research in the following areas:—

(*i*) preparing estimates of demand of different agricultural commodities in the export and internal markets

(*ii*) estimating the potential of each agro-climatic region for the economic production of different agricultural commodities

(*iii*) the organisational frame for agricultural production suited to each region. This includes systems of farming, farmer institutions, and supporting services.

6. There are at present no clear institutional arrangements for collecting, compiling, interpreting and publishing information of this nature for use in the formulation of policy. This short-coming was very acutely felt when the plans for the Mahaweli and Uda-Walawe Projects were being drawn up. The immediate needs were met by getting the data on an *ad hoc* basis but this is an unsatisfactory arrangement for the future. There is a need to set up proper institutional arrangements on a continuing basis for the collection and processing of the data required for agricultural planning. For instance, research in (*ii*) above must be directed towards obtaining basic data on physical resources; — vegetation, geology and soils, water supply and rainfall, climate (temperature, humidity, wind velocities, etc.) topography and existing land-use patterns. Similarly, there must be a readily available body of agro-technical data on different crops and livestock and their management. There must also be an understanding of crop and livestock combinations in economic farming systems situated in different agro-climatic regions of the country. This information must be further consolidated into a series of land capability classification maps and land-use maps which reveal the farming systems that exist and the farming systems that are sought to be developed. All new systems of agriculture must also pay the highest consideration to the scientific principles of conserving natural resources even while they are being exploited.

7. The logic of this approach must inevitably lead to a situation where co-ordination or even unification of all agricultural research now being carried out in different sectors and compartments becomes a necessity. The co-ordination and unification will have to be determined by the priorities of the agricultural plan itself. The recent proposals for the diversification of crops on uneconomic tea and rubber lands and the problems of intensifying agriculture on coconut lands are already high-lighting the need for a closely integrated and supervised research programme for the agricultural sector as a whole.

8. Basic data on physical resources are at present being collected by a number of Government Departments, Boards and by the Universities. A Soil Survey of the Island is being carried out by the Land-use Division of the Irrigation Department. A survey of the Water Resources of Ceylon has been allocated to the Water Resources Board. A survey of the Vegetation of Ceylon is being done by the Department of Agriculture and the Botany Department of the University of Ceylon at Peradeniya in association with the Smithsonian Institute. The Geological Survey is located in the Ministry of Industries. The Land-use Survey carried out by the Hunting Survey in 1959 needs to be brought up-to-date. However, these different projects are operating independently of each other and at different degrees of intensity.

9. There is also a big gap in our knowledge of agro-meteorology. More data is required on temperature, humidity, evaporation, wind-speeds and rainfall in the different agro-climatic regions. Rainfall studies for determining patterns of rainfall distribution and for establishing rainfall confidence limits in different areas are also required. A much greater emphasis would have to be placed on agro-meteorology than is presently being done.

10. The whole question of obtaining adequate data on our physical agricultural resources and in defining agro-climatic regions more precisely and in determining their agricultural potential needs to be treated as a special co-ordinated research project. The responsibility for planning and co-ordinating this project could be vested with the National Agricultural Research Committee of the Ministry of Agriculture and Food proposed later in this Chapter. Specific responsibilities could be allocated to Government Departments and the Universities so that the surveys could be completed according to a specified time schedule.

11. The Agrarian Research and Training Institute meets a long-felt need for research into the institutional aspects of agricultural development referred to at (iii) above. The objectives of the Agrarian Research Institute have been detailed in a comprehensive manner in the plan of operation for the Institution agreed upon between the Government of Ceylon and the F. A. O.—UNDP. For these reasons the functions of the Institution in relation to the Research, Extension, Education and Training programmes discussed in this Chapter have not been taken up.

12. Agricultural Marketing has received very little attention in Ceylon. A great deal of study is required in the field to cover such matters as the Government Guaranteed Price Purchasing Schemes, agricultural marketing in the Co-operative sector and the Private sector. The subject of marketing would include marketing intelligence work, processing, grading and packaging. Research work in these areas had hardly been started in Ceylon and should be built up during the period of the present Plan.

13. The responsibility for agro-technical research and experimentation is at present with the Department of Agriculture; the Tea, Rubber and Coconut Research Institutes; the Sugar-cane Research Institute; the Ceylon Institute of Scientific and Industrial Research (in respect of the processing and utilization of agro-industrial crops) and the Faculty of Agriculture, University of Ceylon.

14. The proposals made here are directed principally towards the organization of research in the Department of Agriculture. But as mentioned earlier, it will be necessary to unify and link all agricultural research within a suitable organizational frame-work. Steps will be taken to fashion such an organization during the period of the present Plan.

Role of Research in the Department of Agriculture

15. The specific matters requiring the attention of research during the Plan period are included in the respective Chapters of this Plan dealing with a crop

or a group of crops. In general terms the programmes involve the breeding of new varieties, the development of management and crop protection techniques for each crop and the integration of different crop combinations, with and without livestock, into economic systems of farming. Interlinked with these are also the programmes of research on the maintenance of soil fertility, methods of soil conservation and the use of farm machinery, tools and implements and processing of farm products. More specifically adequate research is required for an intensification of production on existing crop lands and the development of systems of diversified and mixed farming primarily for the smallholder. A general idea of the scope of such a research programme is given below:—

1. Rice Production Programmes

(*i*) *Intensification of rice production*—

All regions of the country with emphasis on—

(*a*) the major irrigation schemes;

(*b*) the area covered by reclamation and drainage projects in the low-country wet zone;

(*c*) rainfed rice areas.

(*ii*) *Multiple cropping with other field crops in rotation with rice*—

all zones especially on irrigated paddy lands in the low-country dry zone.

2. Diversified and Mixed Farming

(*i*) *The Uda-Walawe Project* — southern low-country dry zone

(*ii*) *The Mahaweli Project* — northern low-country dry zone

(*iii*) *The Lift and Gravity Irrigation Projects* — northern low-country dry zone

(*iv*) *The Youth Settlement Projects* — northern and eastern low-country dry zones

(*v*) *The Special Projects in Colonization Schemes* — northern and eastern low-country dry zones

(*vi*) *The Crop Diversification Project on Tea and Rubber Lands* — low-country, mid-country and up-country wet zones

(*vii*) '*Special Leases*' *Programme.*

3. Vegetable Production Programmes

(*i*) Intensification of production on existing lands — priority in the up-country, mid-country and low-country wet zones.

4. Fruit Production Programmes

(*i*) Development of orchards in different zones of the country — priority in the mid-country and up-country wet zones, low-country dry zone and the low-country wet zone.

5. Other Perennial Crops Production Programmes

(*i*) Intensification of production on existing lands, especially in the mid-country, up-country and low-country wet zones.

16. In order to fulfil a research programme of these dimensions, the Department of Agriculture must be guided by the following considerations:—

1. All research in the Department should as far as possible be of an applied nature and designed to elicit an adequate volume of information in the shortest possible time.

2. Separate budgetary provision will have to be made to ensure that the long-term components of the applied research programme are also carried on without interruption.

3. A realization that research conducted primarily in one ecological region cannot be applied to another. For research to be effective for the farmer the findings must be capable of application in his farm. Such a situation can only be achieved if research is conducted in the different regions.

4. Adequate teams of Research Officers representing the different disciplines should be located within each region.

17. In the light of the above considerations, a brief examination of the present organisation and facilities in the Department of Agriculture is given below:—

Organisation of Agricultural Research in the Department of Agriculture

18. Agricultural Research in the Department of Agriculture is at present organised in two separate Divisions. Crop husbandry including pasture research is in the Division of Agricultural Research while Animal Husbandry and Veterinary Research is in the Division of Animal Health and Production. Livestock and Veterinary Research is dealt with under Animal Husbandry. While noting this separation of Divisions within the Department, it must be clearly emphasised that the policies and programmes of agricultural development embodied in this plan have

been based on the assumption that in the context of the farm itself there will be a fully integrated approach between crop and livestock husbandry.

19. The Division of Agricultural Research is under the Deputy Director of Agriculture (Research) and is at present organised in terms of a Central Agricultural Research Institute at Peradeniya and a number of Research Stations, Experimental Stations and sub-stations located in different areas of the Island. The locations of the Research and Experimental Stations are given in Annexe '1'.

RESEARCH STATIONS

20. The research staff within a region should be located together in a single multi-purpose research station rather than at a number of smaller experiment stations scattered within the region. A concentration of staff makes possible the provision of adequate facilities such as laboratories, libraries and social amenities at greatly reduced cost. In addition, it creates the climate necessary for the exchange of ideas and the build-up teams on the research projects required for the development of the region. On this basis it would be necessary to have a regional research station in each of the major agro-climatic regions in which development programmes have been specified in the plan.

21. The following regions are important in order of priority and a regional research station would eventually be necessary in each of these major agro-climatic regions:—

1. *Low-country dry zone* — Northern region
2. *Low-country dry zone* — Southern region
3. *Wet zone* — Mid-lands region
4. *Intermediate zone* — Semi-dry up-lands
5. *Intermediate zone* — Semi-dry low-lands
6. *Low-country dry zone* — North Western Coastal region (Latosols)
7. *Wet zone* — Low-lands region
8. *Wet zone* — Up-lands region.

22. The solution to the problem of variability within a single region is met, except where the specific situation demands a separate experiment station, by carrying out experiments and trials directly in farmers' fields. The more progressive farmers are always prepared to support such a programme. If the extension staff is associated in these trials a direct link between research, extension and the farmer in the field is also achieved. Besides the running expenses of experiment stations are considerably reduced. It follows from this that the number of sub-stations

should be reduced to a minimum except where there is a need to investigate specific problems of a sub-region on a more or less long-term basis, for example, the problems of alkalinity and salinity in some regions, flooding and poor drainage conditions in the low-country wet zone, the problems of chillie and onion cultivation in the Jaffna Peninsula, etc.

23. Research or Experiment Stations must be located in the area most representative of the region bearing in mind that the research staff should not be deprived of social and civic amenities. These stations should as far as possible be situated in the centre of a farming area and have adequate land and water resources to meet present requirements and the future needs for expansion.

24. The size, staffing, facilities and the phasing of development of regional research stations should be determined in relation to the size, agricultural potentialities of the region and priorities of the development plan.

25. The present location of research and experiment stations and the proposals for new Stations in terms of agro-climatic regions are given below:—

I. The Dry Zone — (*total extent* 14,950 *square miles*)

26. Reference to paragraph 15 will show that most of the new development projects are being located in the dry zone. It is anticipated that the greater part of the increased production of rice, other field crops and fruits, especially mango and passion fruit will come from this zone.

(*a*) **Northern Region** — reddish brown earths

(*Area D1—n*)

(*i*) Maha-Illuppallama — 2,000 acres in extent, 300 acres irrigable

(*ii*) Livestock Research Station, Polonnaruwa

(*b*) **Southern Region** — reddish brown earths

(*Area D1—s*)

(*i*) Suriyawewa — 50 acres irrigable

(*ii*) Angunakolapelessa — 700 acres irrigable — Station being built in the Uda-Walawe Project by the R.V.D.B.

(*iii*) Rice Experiment Station, Ambalantota — 20 acres irrigable

(*iv*) Cotton Research Station, Gonnoruwa — 72 acres rainfed

(*c*) **Eastern Region** — non-calcic brown soils (2,350 square miles)

(*Area D2*)

There is no station in this region which covers a greater part of the Gal-Oya Project, the Batticaloa District and the Tamankaduwa Project.

(*d*) **North Western Coastal Region**—(Latosol region) (1,400 square miles)

(*Area D3*)

The plan envisages the development of cashew production and the use of tube wells for fruit orchards and the cultivation of other field crops.

Experiment Station — Tinnevelly in Jaffna Peninsula (10 acres)

(*e*) **Alkaline and Saline Sub-Regions** — (about 600 square miles)

(*Area D4*)

There is no station at which these specific problems can be investigated.

(*f*) **Regosols** — (beach sands) and very dry coastal low-lands (approximately 1,000 square miles)

(*Area D5*)

This area need not at this stage be considered separately but could be included in the regions given above.

27. The Research Station at Maha-Illuppallama including the Livestock Research Stations at Polonnaruwa and the proposed Station at Angunakolapelessa in the Uda-Walawe Project area could serve as adequate Regional Stations for the northern and southern dry zones respectively.

28. The Cotton Research Station in the southern region will serve no purpose in view of the new regional station and could be closed down.

29. The future of the Suriyawewa Station which is located on the left bank channel of the Uda-Walawe should be reconsidered once the Angunakolapelessa regional station is fully established.

30. The Tinnevelly Station in Jaffna is too small and is situated in an area that is not entirely typical of the latosol region. It cannot therefore be developed as a regional station. It should, however, be retained and expanded as an Experiment

Station to deal with the special problems of the Jaffna Peninsula. The agricultural problems of the latosol region which will be dependent on tube-well irrigation are entirely different from those of the rest of the dry zone and would require the services of a separate regional station. Proposals have already been made for the establishment of a Training School and Research Station at Vanatavillu in the Puttalam District in connection with the development of the water resources of this region.

31. A regional station need not be established on the non-calcic brown soils in the Eastern dry zone as the basic work for this area could be done at the Research Station, Maha-Illuppallama and later from the Angunakolapelessa Station once it is established. An experiment station will however have to be established in the Gal-Oya Valley to handle the more specific problems of that area.

32. In view of the problems of alkalinity and salinity in the dry zone, it would be necessary to establish an Experiment Station in this sub-region of the dry zone at which these problems could be investigated in association with the regional stations at Maha-Illuppallama and the Central Agricultural Research Institute at Peradeniya.

II. The Intermediate Zone — (*total extent 4,355 square miles*)

33. The plan envisages that apart from the intensification of rice production the following main developments will take place in the different agro-climatic regions of this zone:—

(*Area I—1*)

(*i*) In the *semi-dry up-lands* covering a total area of 165 square miles in the Badulla District (Welimada, Bandarawela, Paranagama) intensification of the production of vegetables and potatoes, an expansion in the production of fruits (especially pineapples and passion fruit) milk and meat.

Research Station, Rahangala (120 acres)
Irrigable land 3 acres

(*Area I—2*)

(*ii*) In the *semi-dry mid-lands* covering a total land area of 830 square miles in the District of Ratnapura (Balangoda, Belihul-Oya) Badulla (Haldummulla, Lunugala, Taldena), Kandy (Madugoda) and Matale (Gammaduwa) intensification and expansion of the production of vegetables, tobacco and cardamoms.

There are no Research or Experiment Stations in this region and little is known about the actual potential.

(*Area I—3*)

(*iii*) In the *semi-wet low-lands* covering a total area of 790 square miles in the Southern, Kurunegala and Western Matale Districts, an expansion of milk and meat production in the coconut lands and an expansion of the multiple cropping of maize, sorghum and pulses as rotation crops in paddy fields in the Yala season.

Central Rice Breeding Station, Batalagoda —(50 acres paddy, 60 acres coconut).

The problems of associated crops on coconut lands in this region are being partly handled by the Coconut Research Institute.

(*Area I—4*)

(*iv*) In the *semi-dry low-lands* covering a total area of 2,570 square miles in the Hambantota, Ratnapura, Moneragala, Badulla, Matale and Kurunegala Districts, an expansion in the production of citrus (oranges and limes), tobacco, maize, sorghum, manioc and potatoes. The World Food Programme Maize Project will be located mainly in the Moneragala and Badulla Districts.

(*i*) Rice Experiment Station, Nalanda — (16 acres paddy land)

(*ii*) The New Maize Experiment Station at Maiyangana — (100 acres)

34. The facilities for research in this zone are inadequate. Firstly, there is the need for a regional station in the semi-dry up-lands region which is fast becoming an important agricultural area. The need for information on the production of vegetables, fruits, potatoes, other field crops, other perennial crops and live-stock will become vital in view of the fact that a good part of the tea in this region may have to be replaced by alternate systems of agriculture. The research station at Rahangala at present has inadequate land and irrigation facilities to meet the needs of the programme. There has been considerable difficulty in finding land for the expansion of this station. It may be necessary therefore to establish a new Regional Station in this region incorporating both crop and livestock research.

Secondly, there is a need for a regional station in the semi-dry low-lands particularly in the Moneragala and Badulla Districts. This station is best located in the Moneragala District. The station itself does not need to be a large one as a part of the basic work for the region could be done at Maha-Illuppallama and Angunakolapelessa.

35. An expansion in the work of the Coconut Research Institute and a strengthening of the staff and facilities at the Batalagoda Station would meet the

requirements of the semi-wet low-lands. It should be possible to carry out a great part of the trials and experiments directly on the larger coconut estates. Furthermore, most of the work on multiple cropping could be carried out at Maha-Illuppallama and only adaptative trials in the farmers' fields would be required in this region.

36. It is necessary to defer a decision on providing research facilities in the mid-country region until a more detailed study of this region has been undertaken.

37. The present experiment stations in the intermediate zone will have to continue as they meet a specific need. It would be necessary to expand the Station at Nalanda to include research on tobacco in addition to the work on rice.

III. The Wet Zone — (*total extent 5,710 square miles*)

38. The plan envisages that apart from the intensification of rice production the following principal developments will take place in the different agro-climatic regions of this zone:—

(*Areas W1, W2 and W3*)

(*i*) In *the up-lands* covering a total land area of about 800 square miles in the Nuwara Eliya, Kandy and Ratnapura Districts — an intensification and expansion in the production of vegetables, potatoes, fruits and milk. A part of the region especially in this area will be covered by the U.N.D.P. Crop Diversification Project.

(*i*) Research Station, Sita Eliya — (400 acres)

(*ii*) Livestock Farm at Ambawela and Bopatalawa — (total 8,350 acres)

Tea Research Institute at Talawakele is also located in this region.

(*Areas W4, W5 and W6*)

(*ii*) In *the mid-lands* covering a total land area of about 1,140 square miles in the Kandy, Kegalle, Matale and Ratnapura Districts — an increase in the production of vegetables, fruits, cardamoms, cocoa, pepper, cloves, nutmeg and milk. Almost the whole of this area will be covered by the U.N.D.P. Crop Diversification Project.

(*i*) Central Agricultural Research Institute, Peradeniya — (566 acres)

(*ii*) Experiment Station, Kundasale (487 acres)

(*Areas W7, W8, W9 and W10*)

(*iii*) In *the low-lands* covering a total land area of 3,600 square miles in the Kurunegala, Colombo, Kegalle, Ratnapura, Kalutara, Galle and Matara Districts — an increased production of milk, fruits, especially pineapple and passion fruit, low-country vegetables, cinnamon and associated annual crops in coconut lands.

A part of this area will also be covered by the U.N.D.P. Crop Diversification Project.

(*a*) **Very Wet Low-lands** — (*i*) Rice Experiment Station, Karapincha (129 acres total extent)

(*Area W7*)

(*ii*) Rice Experiment Station, Bombuwela (12 acres irrigable land)

The Rubber Research Institute at Agalawatta and the low-country Tea Research Institute at Ratnapura are also located in this sub-region.

(*b*) **Wet Laterite Low-lands** — (*i*) Fruit Experiment Station, Yakkala

(*Area W9*)

The Coconut Research Institute is also located in this region.

(*c*) **Wet Ill-drained Low-lands** — (*i*) Rice Research Station, Labuduwa

(*Area W10*) (71 acres irrigable land)

39. The wet zone in general terms has an adequate foundation of research and experiment stations. However, there are some special aspects that need mention here.

40. Of the three major regions in the wet zone, the mid-lands region is likely to be the most important during the period of this plan in view of the urgent need to find alternate systems of agriculture for the large extents of marginal tea and rubber lands within the region. Moreover it is also in this region that the major impact in increasing the production of other perennial crops will have to be made. The technical data at present available on which plans for diversification can be prepared is inadequate and a greatly accelerated and intensified research programme will have to be undertaken in this region. The Central Agricultural Research Institute has inadequate land for expansion and is not ideally situated in

relation to the region to undertake such an extended programme of research which would involve work on a wide range of crops, vegetables, pastures and livestock. A part of this work could be done at Kundasale Experiment Station in association with the Faculty of Agriculture but it will be necessary to open a sub-station as an extension of the C.A.R.I. at Gampola where the balance of the work could be done especially the work on pastures and other field crops. This complex of three units would thus constitute the regional research organisation of the mid-lands.

41. The present research stations in the up-lands of the wet zone meet all the needs of the region, if the work between the Sita Eliya Research Station, the Livestock Farms and the Tea Research Institute can be properly co-ordinated. A further expansion of the Sita Eliya Station as a large regional station is therefore considered unnecessary.

42. A similar approach should also be made in the low-country wet zone if the work of the different Research Stations and Institutes within the region could be co-ordinated. Such an approach would eliminate the need for the Department to establish a regional station in the wet zone. Nevertheless, there is a need for a research station that will undertake work on fruits, particularly pineapple and passion fruit, low-country vegetables and the problems of associated crops and livestock in coconut estates. The problems of diversification on low-country tea and rubber lands have also to be settled. In the circumstances, it may be necessary to build up the staff and research facilities at Karapincha, which is located in the low-country tea area not far from the low-country tea research station and at Ambepussa farm in the low-country coconut area for work on vegetables, fruits and pastures.

43. The Rice Experiment Stations at Bombuwela and Labuduwa will have to be continued and the staff and facilities at Bombuwela expanded to provide for new varieties and cultivation methods suited for the rice lands that will be reclaimed in the Land Reclamation and Drainage Projects in this region.

44. The Fruit Experiment Station at Yakkala could be shifted to the proposed Station at Ambepussa once the facilities are provided there.

RESEARCH STAFF

45. There are four categories of technical staff employed in the Research Division:—

1. Research Officers, recruited with a first or second class degree or post-graduate degree in Agriculture or Science;
2. Experimental Officers, recruited with a degree in Science or Agriculture;
3. Agricultural Instructors, recruited with a Certificate in Agriculture from the School of Agriculture, Kundasale;
4. Laboratory Assistants who are recruited with a G.C.E. (O.L.) Certificate in Science.

The general levels of recruitment in relation to the functions the staff have to perform need no basic changes. There are, however, some problems in regard to the recruitment and retention of Experimental Officers and Agricultural Instructors in research. This subject will be discussed in more detail later.

46. Before examining the present position of technical staffing and the need for additional staff for research, it would be necessary to consider some general principles on which the need for research staff could be judged.

(*i*) Research Officers can be considered under two categories according to their specialised training and basic qualifications. Firstly, those trained in specific scientific disciplines such as plant genetics and breeding, plant physiology, soil chemistry, soil physics, plant pathology, entomology, agricultural economics and farm management, agricultural engineering, irrigation and water management, etc. Secondly, those trained for research in agriculture production methods and techniques, as for example in the production of field crops, (rice, maize, cotton, tobacco, pulses, oil seeds etc.) vegetables, fruits, other perennial crops (cocoa, coffee, cardamom) etc. Clearly the present trends towards regional specialization and the development of farming systems (in which all the technical aspects of farm development should be covered by research) adapted to each region demand that the research staff posted to work at regional stations should consist of teams in which there is a mixture of different 'disciplines' and different specialists in crop and livestock production consistent with the specific requirements of the region. The exact composition and scope of the team will have to be determined according to the priorities of the development plan.

(*ii*) In general, a basic research unit representative of the following fields of research is essential at any regional station if it is to properly discharge its responsibility:—

1. Crop Production (agronomy)
2. Plant Breeding
3. Soil Chemistry
4. Entomology
5. Pathology
6. Agricultural Economics
7. Agricultural Engineering
8. Livestock Production. (The area of Livestock production only has been included in the regional team because other important research activity in Animal Husbandry are being carried out from centralized locations)

Such a team will be able to cover the basic requirements for crop improvement, management, fertilizer practices, pest disease and weed control and also determine the economics of the recommendations that are being made

and the farming systems that are being developed. The number of Research Officers at a regional station in crop breeding and crop production would depend on the importance of the different crops in the region. For example, it may be necessary to have separate breeders for rice, maize, coffee, cocoa, cotton and other crops as necessary. A similar situation would arise with regard to crop production research and in the other areas of work. The need for inclusion of different yet related 'disciplines' at a regional station, *e.g.*, irrigation and water management, agricultural engineering, soil conservation, soil micro-biology, livestock production would depend on the specific requirements of the region, the project or the commodity that is the subject of research. In many cases there may not be a need to station a Research Officer permanently at a station but only for the duration of a particular research project. The organisation has to be flexible enough to permit of a continuous interchange of staff between regional stations according to the dictates of the programme.

(*iii*) In the operation of research programmes the basic approach is to define a series of research projects designed to provide information to meet the practical requirements of the farmers and to allocate different members of the research team to each project. This would mean that Research Officers in the different disciplines would be represented in more than one research project. For example, the breeding of a variety of maize may require the co-operation of the Soil Chemist, the Pathologist and the Entomologist.

47. In the light of the above considerations, a brief review of the present cadre and organisation of the Research Division is given below. The staff position in terms of agro-climatic regions and activities is given in annexe '2'. A summary of available staff allocated crop-wise is as follows:—

Present Allocation of Functions — Research Staff in the Department of Agriculture

	Research Officers	*Experimental Officers*	*Agriculture Instructors*
1. Field Crops			
(*a*) Rice	32	20	18
(*b*) Other Field Crops including Tobacco	10	8	5
2. Horticulture			
(*a*) Vegetables	3	—	—
(*b*) Fruits	3	3	5
3. Other Perennial Crops	1	—	3
4. Pastures	5	2	2
	54	33	33

5. Other activities located at the C.A.R.I., Gannoruwa

(*a*) Cereal Chemistry	1	—	—
(*b*) Food Technology	2	—	—
(*c*) Soil Conservation	3	—	6
(*d*) Plant Introduction	—	1	—
(*e*) Systematic Botany	1	—	1
(*f*) Projects and Programmes ...	—	2	2
(*g*) Field Testing Unit	1	—	13**
	8	3	22

**Located in different regions in the Island

6. Farm Machinery

(At Research Station, Maha-Illuppallama)	2	—	2
	2	—	2
GRAND TOTAL	64	36	57

Provision has also been made for the appointment of a team of 9 Research Officers to the Research Station in the Uda-Walawe Project during 1970—71 and 1971—72.

48. It will be seen that 80 per cent of the staff is at present located at two stations, the Central Agricultural Research Institute at Peradeniya and the dry zone research station at Maha-Illuppallama. Of the total number of Research Officers available nearly 60 per cent are engaged in rice research.

49. In terms of regional stations this would mean that only the Northern and Southern Low-country Dry Zones and the Mid-lands are adequately staffed Staff at all the other proposed regional stations will have to be built up.

50. In terms of crops, the position as regards rice research is satisfactory. Additional staff will be required for other field crops while the work on vegetables, fruits and other perennial crops will have to be considerably strengthened. The requirements of staff for animal husbandry research are reflected in the Chapter on Animal Husbandry.

51. In terms of 'disciplines', work on irrigation and water management, farm machinery (tillage and processing equipment), agricultural economics and farm

management and soil conservation have to be very considerably strengthened. The cadre of Entomologists, Pathologists and Soil Chemists at the regional stations will have to be built up.

52. A specific reference must be made at this point about research on soil and water conservation methods. The present recommendations for soil and water conservation practices to be adopted by farmers are not based on a solid local experimental foundation and it is vital that a separate long-term co-ordinated research project be initiated at the different regional stations in association also with the Research Institutes and the University of Ceylon. This aspect of research cannot be postponed any longer in favour of the more short-term research programmes as is being done at present.

53. Clearly in relation to the responsibilities that research will have to face in developing the different regions of the country the present staffing is inadequate, a considerable investment in additional staff will be necessary if these obligations are to be fulfilled.

PLANNING, DIRECTION AND EVALUATION OF RESEARCH

54. While it is essential that each Research Officer should enjoy a high degree of freedom to develop his research programmes according to his own genius, the need for a team approach and the applied nature of the research work will impose some restrictions on him. The development of regional research teams with a 'mixed' composition of research officers raises special problems in the planning, control and evaluation of research programmes. All research officers must necessarily work under one Head in-charge of the Station. This is an essential requirement if the work at the station is to be properly co-ordinated and controlled. Nevertheless, the Head of a station will rarely be qualified to technically supervise and evaluate the programmes of research of all the research officers in the different disciplines working under him. This difficulty can only be overcome by providing a framework for each individual discipline to be vertically linked to the more senior officers of the discipline irrespective of the place where such senior men may be located. This in operational terms means that officers of one discipline *e.g.*, Entomology will belong to the Division of Entomology and submit to technical direction and evaluation by the Senior Entomologist. At the same time each research officer being a member of a regional research team located in a station must submit to the general directions and disciplinary control of the Head of that station. A framework of this nature is found in other countries faced with similar situations of controlling the work done at regional stations.

55. The regional stations will form part of a national research network with policy guidance and periodic evaluations as built-in parts of the system. The nature of this organisation is described below:—

56. The research programme has to be developed within the framework of the general priorities set by the plan and the specific priorities set for the region,

project or commodity. Since the objective of research is the improvement of farm technology and the solution of agro-technical problems arising on the farm, it is logical that the identification of research problems and the formulation of these problems into research projects should begin from the farm level upwards. The development of an institutional mechanism which ensures that only the pressing practical problems are actually investigated by research is crucial to the whole process of modernizing agriculture. The present links between farm problems and research programmes are rather tenuous.

57. A distinction must be made here between short-term research programmes designed to solve immediate farm problems and long-term programmes designed to obtain a better understanding of the national resources, their utilization, management and conservation. This distinction should be clearly reflected in the formulation and presentation of research programmes. As was mentioned earlier, separate budgetary provision will have to be made for long-term applied research to ensure its continuity. As for short-term research, the need will generally be posed by extension or by the dictates of programmes which are in operation. In a regional programme of research this responsibility would therefore clearly rest on those who are charged with the responsibility for regional development. On the other hand, the responsibility for the execution of the research programme, its technical supervision and evaluation is clearly the responsibility of the research organisation. There is however an important aspect to research work that needs to be raised here. There is a tendency for investigations and experiments to drag on endlessly. Proper arrangements have to be made to see that the progress of the research work of each research officer is critically evaluated and unprofitable lines of work terminated. While this may have some adverse effects on the initiative and morale of research officers, it is essential that some balance be maintained in relation to terminating research work that is getting nowhere.

58. Having these considerations in mind, it is proposed that the organisational structure for planning, executing and evaluating research should be on the following lines:—

(*i*) The Deputy-Director for Research will be responsible for implementing the scheme of regional research stations with multi-disciplinary teams proposed here. In addition he will be immediately responsible for implementing the decisions of the Research and Experiments Committee of the Department which functions under the Chairmanship of the Director of Agriculture.

(*ii*) A regional research committee consisting of the following representatives be established in each of the major agro-climatic regions, to decide on the priorities of research within the region —

1. Heads of Regional Research Stations and Research Institutions not in the Department of Agriculture
2. Representative Research Officers

3. The District Agricultural Extension Officers
4. The Government Agents
5. Leading farmers representing the main agriculture enterprises in the region nominated from among members of the District Agricultural Committee.

The manner in which this Committee will meet and discharge its functions will have to be set out in implementation.

(*iii*) The existing Research and Experimental Committee of the Department of Agriculture which meets rarely should be made an effective body in the co-ordination, control and evaluation of research programmes within the Department of Agriculture.

(*iv*) A National Agricultural Research Committee should be established in the Ministry of Agriculture and Food to co-ordinate, review and advise on the policies and programmes of research falling within the scope of the agricultural development plan and advise the Minister on matters relating to Agricultural Research. This Committee should consist of:—

1. Director of Agriculture Planning, Ministry of Agriculture and Food (Convenor)
2. Representatives from the National Science Council
3. Representatives from the Planning Ministry
4. Representatives from the Tea, Rubber and Coconut Research Institutes
5. Representatives from the Department of Agriculture
6. Representatives from the Faculty of Agriculture, University of Ceylon
7. Representatives from the C.I.S.I.R.
8. Representatives from the Ministry of Lands, Irrigation and Power
9. Representatives from the Agrarian Research and Training Institute
10. Persons not in state agencies and representatives of farming activities.

SERVICING OF RESEARCH STAFF AT REGIONAL STATIONS

59. The many services that research requires have to be provided centrally or in the regional station itself. Consideration of cost will naturally demand that certain services are provided only through a central organisation. For instance, the following services can be centralized with advantage:—

1. Analytical Laboratory Services

The analysis of plant materials, soils, foodstuffs, animal feeds, fertilizers, agro-chemicals — (pesticides, fungicides and herbicides). There are two main sources of demand for these services —

(*a*) Research Officers who require these analysis in the course of their research studies, and
(*b*) the extension service and farmers.

There is also a need for quality control of fertilizers and agro-chemicals on sale to farmers. Such a Laboratory service is an important requirement in any agriculture development programme. Steps have already been taken in this direction.

2. Field Experimentation and Statistical Service

Most Research Officers require expert assistance in designing effective experiments and in the analysis of the results. Such assistance is required in complex experiments designed to provide information on a number of factors simultaneously. At the moment this unit is staffed by a Statistical Officer loaned from the Department of Census and Statistics. Such an arrangement is unsatisfactory as there is a constant movement of officers in and out of the unit. It is essential that the staff manning this unit be especially trained for this work and that they be retained in the unit for a considerable period of time. In any case, the unit will have to be expanded if it is to meet the expanded demand that will arise once the regional research programme gets underway.

3. Library and Research Information Service

Much time, energy and financial expenditure can be saved, if Research Officers are fully conversant with the latest information and developments in their fields of work, especially in countries with more or less similar climatic conditions. This is a *sine qua non* for expeditious and efficient research work and positive arrangements have to be made to ensure that Research Officers are not impeded in their work on this score.

While adequate funds have to be provided for the establishment of regional libraries at which the relevant and essential books, periodicals and abstracting journals would be available, the need for a fully representative Central Library cannot be overstated. There are at present some difficulties in obtaining foreign exchange for the purchase of technical books, etc., from abroad, and it is urged that this restriction be removed. The Library, however, should not only be a mere repository of books and journals but an active intelligence centre that is charged with the function of operating as an information service to the research workers at the regional stations. Additional staff and better training of the existing staff in carrying out these functions will be required.

4. Plant Introduction Service

The breeding of new strains of crops is taking place in a large number of countries and it is becoming increasingly difficult for the individual research worker to keep track of these developments. On the other hand, if research officers indiscriminately import new varieties several difficulties are likely to arise. There is a risk of introducing new diseases and pests. There will be unnecessary duplication and the maintenance and follow-up of overall records of performance will be difficult. Plant introduction and initial screening under quarantine is therefore best carried out as a centralised service. The functions of such a service would be to —

(*i*) keep track of information on the production of new varieties in other countries and pass on the information to research officers,

(*ii*) maintain a reference library with information of different crops available in other countries,

(*iii*) maintain an accession index of all crops introduced into the country with details of subsequent performance,

(*iv*) import new varieties for testing and carrying out initial screening trials in association with the respective research officers concerned before seed is passed on to the regional stations,

(*v*) collect and despatch seed requested by research workers in other countries.

At present there is one Experiment Officer handling the plant introduction work and it is necessary that this service should be built up into a viable and effective unit.

5. Plant, Disease and Pest Identification Service

A central unit that performs the functions of identifying plant species, fungi, bacteria and insects is required by research workers, farmers and the extension service. While the function is now being carried out by the Research Division at Peradeniya, where a good part of the time of Research Officers is spent in identification, it may be necessary to establish a definite service to perform these functions. Associated with such an activity would also be the work on systematic botany, entomology and mycology and the establishment of museum collections of type specimens. While these facilities exist for Systematic Botany, they will have to be built up for Entomology and Mycology. While such a function may not legitimately be that of the Department of Agriculture, it is suggested that this work be started by the Department. The question of transferring it to the University could be considered at a later date.

60. These services will be established at the Central Agricultural Research Institute at Peradeniya. It may also be necessary to consider the centralized establishment of photography, workshop, and other such facilities, if the need for the use of expensive equipment arises in the future.

LINKS WITH EXTENSION

61. Reference has already been made to the need to integrate research and extension. The crucial areas in which this must take place are in the identification of research problems, in the formulation of research projects and programmes and in the speed and effectiveness with which research results are communicated to the farmer. The following specific proposals are made with a view to effecting the kind of integration that need to be achieved.

1. The inclusion of extension personnel in the research committees proposed earlier in this report.

2. The establishment of an 'Agricultural Centre' at each of the major regional stations. Each centre would be the regional headquarters of the 'Extension subject matter specialists' and would have a training school for staff and specialized farmer training. This subject is discussed in detail in the sections under Extension, Education and Farmer Training.

3. The appointment of crop and livestock production specialists in extension and the grouping of these production officers along with the relevant research officers in 'Commodity Committees'. A recommendation to this effect was also made by the Brady Committee in a report on the 'Organisation of Research in the Department of Agriculture' as follows:— "The general procedure already adopted for rice variety development and evaluation should be followed in developing long-range commodity-oriented research and extension programmes for each major commodity or group of commodities. A tentative grouping of these commodities is as follows:—

   (*a*) Rice
   (*b*) Maize and sorghum
   (*c*) Vegetables (including potatoes, chillies, onions)
   (*d*) Horticultural crops
   (*e*) Minor export crops
   (*f*) Pastures and forage crops
   (*g*) Animal production and health.

For each of these commodities or groups of commodities a task force of scientists and educators should be established. Working under the chairmanship of a senior scientist who would serve as programme leader, the task force would develop five-year programmes for both research and extension. In addition, they would develop annual work plans for specific activities relating to breeding and variety testing, soils and fertilizers, plant or animal protection, and crop or animal management. Following the general procedures already in use with the co-ordinated rice variety trials, other co-ordinated trials for various purposes would be established in the agro-climatic regions where the crops (or animals) are important.

The task force membership would include representatives of pertinent disciplines such as (in the case of crops) Genetics and Plant Breeding, Applied Botany (Physiology and Agronomy), Entomology, Plant Pathology, Agricultural Chemistry (including Soil Science) and (where pertinent) Horticulturalists. In addition, each task force should include a representative from the major field stations at which trials are to be run.

The programme leader is expected to visit each of the co-ordinated trials at least twice during each growing season. He should critically evaluate the experimental techniques used".

The details of composition and operation of these Committees can be worked out in implementation.

4. Field testing

Recommendations made on the basis of results obtained at specific research stations are not always applicable directly in the field and 'adaptability' tests have to be made under farming conditions in farmers' fields to ensure that the recommendations really 'work'. This is at present done in two stages through — (*a*) a *Field Testing Unit* attached to the Research Division which tests recommendations for new varieties, fertilizers, insecticides, fungicides and herbicides at a limited number of locations in farmers' fields in relatively more complicated field experiments, and — (*b*) *the Extension Service*, where Agricultural Instructors set down simple trials and demonstrations in farmers' fields in their ranges based on the results obtained by the Field Testing Unit. There are several advantages in this procedure. The applicability of research recommendations over a wide range of field conditions is obtained. The extension personnel achieve the necessary confidence that what they are recommending to the farmer really works. Where the expected results are not obtained further investigations by research is possible. Thus another important two-way link between research and extension is established.

The Field Testing Unit developed from the organisation set-up for the Australian Freedom from Hunger Campaign Soil Fertility Project under Dr. Constable. It is necessary to make this a permanent unit and to staff it adequately as it has an important role to play. This unit could initially be located at Peradeniya and decentralized later to the regional stations when they are established.

5. Regular visits of groups of Research Officers to 'problem areas' so that discussions with farmers and extension staff could take place in the field.

6. Extension staff to visit research and experiment stations and to attend lectures, seminars and discussion groups organised by the Research Divisions.

7. The holding of an annual conference between representative research and extension personnel initially at a regional level at which major problems could be discussed. Based on these exchanges, an agenda for a larger scale annual conference could be organised at National Level.

8. The establishment of a small 'publications unit' with specially trained staff within the Research Division probably as a part of the Library and Information Service, which will be responsible for collecting the results of research and experiments conducted by the Department after clearance by the Research and Experiments Committee and for presenting these results in a form that could be utilised by the Extension Division. The staff of this unit will have to work in close collaboration with the General Information Unit of the Department of Agriculture.

LINKS WITH THE FACULTY OF AGRICULTURE, UNIVERSITY OF CEYLON

62. The Faculty of Agriculture is represented on the Research and Experiments Committee of the Department of Agriculture. The teaching staff also assists at the In-Service Training Centres at Peradeniya and Maha-Illuppallama.

63. Financial grants for specific research projects approved by the Research and Experiments Committee have already been made. Furthermore, facilities for University Staff to carry out approved research projects at Research Stations of the Department could also be made. It is proposed that separate budgetary provision be made annually in the votes of the Department of Agriculture as grants for research to be carried out for the Department by the University.

64. Arrangements have been made by the University to accept Research Officers from the Department for the M.Sc. degree. The University also annually provides 5 places in the B.Sc. degree course for Agricultural Instructors from the Department of Agriculture.

65. The basis for a close collaboration has now been established and it is expected that these links will be strengthened during the period of this plan.

FLORICULTURE RESEARCH

66. In view of the increasing importance of the cut flower export industry as a foreign exchange earner, it is proposed that an organised programme of research on floriculture be undertaken by the Department of Agriculture. For the present this is best undertaken within the Gardens organisation as there is already a considerable expertise in floriculture at the different Gardens maintained by the Department. A start could be made at the Royal Botanic Gardens at Peradeniya.

AGRICULTURE RESEARCH UNDERTAKEN BY THE MINISTRY OF LANDS, IRRIGATION AND POWER

67. There are at present two research units located in the Ministry of Lands, Irrigation and Power. These are the Land Use Division and the Sugar-cane Research Institute about which some comment has to be made here.

(*i*) The Land Use Division

The staff attached to this Division is as follows:—

1. Head, Land Use Division
2. 6 Research Officers in Soil Science
3. 20 Technical Assistants
4. 2 Cartographers
5. 6 Laboratory Assistants.

The Land Use Division was established in 1958 within the Department of Agriculture with the responsibility for carrying out the following functions:—

(*a*) The National Soil Survey
(*b*) Demarcation of Agro-climatic Regions
(*c*) The Production of Land Use and Land Capability Classification Maps.

The Division was transferred to the Irrigation Department in 1964 to undertake Soil Surveys for the major irrigation schemes, particularly for the Uda-Walawe and Mahaweli Projects.

The unit as presently staffed can, in fact, only undertake soil surveys. It has no Agriculture Economists, Agronomists, Agro-meteorologists or other relevant Specialists on its staff. The separation of the unit from the Department of Agriculture has placed it away from close contact with the research on crops and livestock. Such a situation makes it difficult for the Land Use Division to undertake its major functions namely, that of interpreting soil surveys in terms of practical, economic systems of land use and land capability classifications.

In operational terms the functions of Soil Survey can be separated from the other functions assigned to the Land Use Division. Soil surveys can be carried out by a self-contained and specially trained team of Soil Scientists. The preparation of land use and land capability maps on the other hand requires the integration of research findings from a wide range of disciplines and research stations. If the Land Use Division were to undertake its own investigational work it would lead to an unnecessary duplication of effort. In the circumstances, it would seem logical to transfer the Division back to the Department of Agriculture.

(*ii*) The Sugar Cane Research Institute

The Sugar Cane Research Institute is located in the Sugar Cane Plantation at Kantalai and is run by the Sri Lanka Sugar Corporation. The research staff at this Institute consists of the following:—

1. Director — (Colombo-Plan Specialist from abroad)
2. One Sugar Cane Agronomist
3. One Chemist
4. One Pathologist
5. One Entomologist.

As in the case of the Land Use Division this Institute is separated from the Department of Agriculture and is therefore unable to utilise the research facilities and other research services available in the Department of Agriculture. The case for Sugar Cane research must receive special emphasis if local production is to make a serious impact on imports. At present sugar imports occupy a high place close to

that of rice imports. This agricultural plan envisages Ceylon reaching near self-sufficiency in rice production by about 1975. If these anticipations are realized public attention will soon be focussed on sugar imports and the capabilities of the local sugar industry to raise its levels of production. In these circumstances, it will be less expensive and more rewarding to bring the Sugar Cane Research Institute within the Research organisation of the Department of Agriculture.

GENERAL PROBLEMS OF STAFFING OF RESEARCH AND EXPERIMENT STATIONS

68. Reference was made earlier to problems in the employment of Experimental Officers and Agricultural Instructors in Research.

Experimental Officers

The Experimental Officers cadre was established in 1967. The salary scales (new consolidated scales) are:—

Special Grade	—	Rs. 8,760 — 240 — 9,480 per annum
Grade I	—	,, 7,500 — 180 — 240 — 8,520 per annum
Grade II	—	,, 5,304 — 120 — 180 — 7,320 per annum.

The Special Grade and Grade I scales are similar to those obtaining in the comparative grades of the Agricultural Instructorate.

69. Recruitment is from candidates with a B.Sc. pass degree in Agriculture or Science. (Research Officers are recruited with a first or second class degree). Experimental Officers are eligible to apply for posts of Research Officers after they have been 10 years in service. There are 56 sanctioned posts of Experimental Officers of which 20 are at present vacant.

70. As a result of the unattractive salary scale in comparison with graduates' salary scales elsewhere and the long period of time that an Experimental Officer has to wait for promotion there has been a constant flow of staff in this grade out of the Department. The question of placing Experimental Officers on a higher scale and/or reducing the period of eligibility for promotion needs to be seriously considered.

Agricultural Instructors

71. There are 57 Agricultural Instructors working in Research who have no prospects for promotion as Research Officers. Their colleagues in other Divisions of the Department are able to go up as Agricultural Officers. This position has lead to considerable frustration and also to the movement of Agricultural Instructors out of research to other Divisions of the Department. The promotion of Agricultural Instructors as Experimental Officers does not offer a solution as the Grade I and Special Grade salary scales of both grades are similar. A solution to this problem has therefore to be found. There are two possible lines of action. One is by grant-

ing scholarships to promising Agricultural Instructors to obtain B.Sc. degrees either locally or abroad and the other is by providing avenues of promotion to the grade of Research Officer, as a special condition to a specified number of highly talented Agricultural Instructors who have proved their worth in research.

72. Research staff by the nature of their duties will be called upon to reside at given Research or Experiments Stations more or less permanently or at least for very long periods of time. Since most of the Stations are situated in areas relatively remote from towns and social amenities such as good schools, hospitals, etc., special social difficulties will be placed on the staff working at these Stations. The position of the Research staff is therefore in a sense not entirely comparable with that of the rest of the Public Service. Moreover, research involves creative work where initiative and dedication are of prime importance to success and special arrangements will therefore have to be made to ensure that morale is maintained at a high level. Incentives like free quarters, a special station allowance or special arrangements for schooling and medical attention would be desirable.

TRAINING

73. Proposals for training Research staff is dealt with in the section on Education and Training.

74. **Summary of proposals for research and experiment stations**

1. The following research and experiment stations are proposed:—

1. Research Stations

1. Central Agricultural Research Institute, Experiment Station, Kundasale and Experiment Station, Gampola
2. Agricultural Research Station, Maha-Illuppallama and Livestock Research Station, Polonnaruwa
3. Southern dry zone region, Angunakolapelessa, Uda-Walawe
4. Intermediate zone, semi-dry up-lands — site to be decided around Bandarawela — Welimada
5. Intermediate zone, semi-dry low-lands — site to be decided in Moneragala District
6. Dry zone latosol region — Vanathavillu in Puttalam District
7. Wet zone, low-lands region, Ambepussa
8. Wet zone, up-lands, Sita Eliya and the Livestock Farms at Ambawela and Bopatalawa

2. Experiment Stations

(*a*) Experiment Stations — (*primarily rice*)

1. Batalagoda — intermediate zone — semi-wet low-lands (Central Rice Breeding Station)
2. Ambalantota — Southern dry zone (heavy soils)
3. Bombuwela — Wet zone — very wet low-lands
4. Labuduwa — Wet zone — ill-drained low-lands
5. Karapincha — Wet zone — very low-lands
6. Nalanda — Intermediate zone — semi-dry low-lands
7. Pussellawa — Wet zone — up-country zone (cold tolerance studies)

(*b*) Primarily other Field Crops and Pastures

1. Site to be selected in Gal-Oya Valley

(*c*) Maize Experiment Station

1. Maiyangana — Semi-dry low-lands, Badulla District

(*d*) Chillies and Onions

1. Tinnevelly — Latosol region, Jaffna Peninsula

(*e*) Tobacco

1. Hanguranketa

(*f*) Cinnamon, Citronella

1. Site to be selected in Matara District

(*g*) Soil Salinity and Soil Alkalinity Problems

1. Site to be selected in regions affected by alkalinity and salinity.

AGRICULTURAL EXTENSION

1. The role of agricultural extension has recently been defined in a Food and Agriculture Organisation publication as one of 'Improving the human resources in rural areas and promoting its mobilisation for family and social development'. This, in fact, is one of the basic objectives of agricultural development and in the Ceylon context covers the functions of the Department of Agriculture, the Department of Agrarian Services, the Department of Co-operative Development, the River Valleys Development Board, the Department of Rural Development, the Land Commissioner's Department, the Advisory Services of the Tea, Rubber and Coconut

Research Institutes and the voluntary organisations such as the Rural Development Societies, the Mahila Samities, etc.

2. An organisation for agricultural development in the present context in Ceylon must seek to harness the activities of these institutions to serve specific agricultural policies and programmes presented in this plan. This approach, therefore, is a relatively limited one when compared to the larger and indeed all-inclusive perspectives of extension suggested in the F.A.O. definition. More specifically this discussion focusses attention on the educational aspect of improving and diversifying agriculture and on the extension services of the Department of Agriculture.

3. There are at present six separate agencies charged with these functions: the Department of Agriculture, the River Valleys Development Board, the Land Commissioner's Department and the Advisory Services of the Tea, Rubber and Coconut Research Institutes. In the section on research specific proposals were made for integrating the functions of these different agencies. The need for integration is equally strong in the field of agricultural extension and it should be possible to develop an organisation somewhat similar to that proposed for research for extension as well.

4. The subject of agricultural extension has not been dealt with in any official document in the past and it would therefore be useful to present a brief history of extension in the Department of Agriculture so that the present staffing, structure and organisation is seen in perspective.

I. Survey of the History of Agriculture Extension in the Department of Agriculture

5. Agricultural extension in essence means educating and assisting the farmer to obtain the best economic returns from his land. Farmer education in Ceylon has for a long time recognised three themes which are fundamental to agricultural extension:—

(*a*) that agricultural productivity depends on the application of science and technology to farming,

(*b*) that the methods of such application are opened up by locally conducted research and experiments,

(*c*) that the results of this research and experimentation should be passed on to the farmer through programmes of farmer education.

6. The need to build proper institutions to carry out these functions of research and extension have also been recognised in policy statements over the years. Nevertheless, the conclusion is inescapable that the clarity of policy statements was often not matched by effectiveness of implementation. The reason for this divergence between stated policy and its implementation could be traced partly to shifts in policy and partly to organizational problems. A brief survey of landmarks in the policy and organisation of extension and farmer education during the past will make these points clear.

7. Prior to 1904 the responsibility for agriculture extension was vested in the Government Agents of the Provinces. In 1904, the Ceylon Agriculture Society was established and its objectives are worth quoting because they give an insight into the approach to extension at that time.

> "The object of establishing this Society is to get at the native cultivator, and especially the villagers, by means of the wealthier local land-owners and planters and to bring to the hand of everyone who wishes it the experience and knowledge of the various branches of agriculture possessed by Peradeniya staff, the Government Veterinary Surgeons and other officials, and as far as possible also that of the various experienced planters and agriculturists belonging to the Society".

8. The Department of Agriculture was established in 1912 and in 1919 the first Agriculture Officers were appointed "to serve the needs of the cultivators in their respective Districts". But it was not until 1921 that the extension work which was under the control of the Ceylon Agriculture Society and the Government Agents was taken over by the Department of Agriculture.

9. The emphasis of the research and advisory services prior to 1921 had been largely in the plantation sector. Food shortages during the First World War and increasing local pressure resulted in the beginning of a shift towards dealing with problems of peasant agriculture.

10. The functions of the Department of Agriculture were set out in the Administration Report of the Director for 1922 as follows:—

> "The main duties of the Department are research, extension and education. Education be it by lectures, leaflets or demonstrations, cannot be undertaken with success, unless it is based on definite facts, which have been ascertained by research and established by experience".

Again in 1932, the Director of Agriculture stated in his Administration Report that —

> "All effort has been extended to bring the agriculture staff into as full contact as possible with the villagers. Fullest attempts have been made to bring the so-called experiment stations to serve more the purposes of demonstration stations and depots to which the surrounding cultivators can look for practical help and for a supply of seeds and planting material".

11. Thus, it is clear that the main policy lines in regard to the functions of the Department were established quite early in its existence.

12. The first field organisation for extension was established between 1880 and 1904 when Agricultural Instructors trained at the School of Agriculture (two-year

course) were appointed to work with the Government Agents of the Provinces. Between 1904 and 1921, the field staff of Agriculture Instructors were controlled by the Ceylon Agriculture Society in association with the Government Agents. There were no direct links either with research or with the Department of Agriculture which was established in 1912. With the creation of 6 Agricultural Divisions in the Island and the appointment of Divisional Agricultural Officers to the Department of Agriculture in 1919 and the absorption of the field staff of the Ceylon Agriculture Society into the Department in 1921, an unified field service working directly under the Director of Agriculture was established. The Divisional Agricultural Officer was in-charge of a geographical region of the country, the Division, while the Agricultural Instructor was in-charge of a 'range' within the Division and worked directly with the farmers under the direction and supervision of the Divisional Agricultural Officer. Both were generalists and handled all the agricultural problems within their areas. At the same time, the Research Officers attached to the Research Headquarters at Peradeniya were expected in addition to linking-up with the field staff in the Districts, *to do advisory work directly with farmers and planters.* In 1932, the Propaganda Division was created "to convey the results of scientific research to the public and more specially to the village agriculturist". This Division operated as an information unit working through the Divisional Agricultural Officer of each District.

13. Thus, the basic framework of an extension organisation, namely, a field service in contact with the farmer, an information unit for the preparation of teaching material and visual aids and links with research were also established by 1932.

14. A Young Farmers' Programme was started in 1951 and a Home Economics Programme initiated in 1958. With the linking of these two programmes with the programmes for adult farmer education the basic requirements, at least in theory, for an integrated extension service were completed. If so, what prevented the growth of a truly effective and national extension service on the foundations so clearly laid out many decades ago? A few of the more important reasons are worth recalling because they are relevant to the purposes of this plan.

Reasons why an effective extension organisation did not develop in the Department of Agriculture

15. One factor that prevented the growth of an intensive extension service was the fact that the Divisional Agricultural Officer was saddled with multifarious duties outside the field of extension. At best his efforts were diffuse and dissipated. At worst he had an alibi for failure on all fronts. Evaluation and accountability was excluded from this system of responsibility. This position continued up to 1945, when the research functions were removed from the Divisional Agricultural Officers, who however continued with all the other activities. In 1957, the Divisional Agricultural Officer grade was abolished and replaced by a grade of District Agricultural Extension Officer. A District Agricultural Extension Officer was posted to each of the twenty two newly created administrative districts but continued to carry out

most of the duties of the Divisional Agricultural Officers, except for research and the management of the very big farms and the commercial enterprises that were being started at the time. It was only in 1963 with the creation of the Agriculture Education and Farms Division that the District Agricultural Extension Officer was finally freed to concentrate entirely on extension activities and the conditions were at last created for the development of an effective extension service.

16. Another factor that had an adverse effect on extension was that for a long period there was no officer at the Head Office who was charged with the specific responsibility for extension. From 1921 to 1956, the Divisional Agricultural Officer in-charge of the field divisions worked directly under the Director of Agriculture. In 1957, the Deputy Director of Agriculture was given the responsibility for extension but he was also in-charge of all government farms, school farms, farm schools and the School of Agriculture. Obviously, the special place and specialised nature of extension had not been realised. It was only in 1964 that a Deputy Director was given the sole responsibility of extension work.

17. The small numbers of extension staff in the field proved to be another limiting factor. In 1923, there were 3 Divisional Agricultural Officers-in-charge of 3 to 6 Agricultural Divisions. This number was increased to 4 in 1927 and 6 in 1932. By 1939, the number of Agricultural Divisions had been increased to 9 which remained the same until the new Districts were created in 1957 when the number of Divisions was increased to 22. Between 1880 and 1904, there were 4 Agricultural Instructors working in the field. By 1927, there were 6 Agricultural Instructors and in 1939 there was a total of 74 Agricultural Instructors in the Department of which about half were in the field. In 1956, there was a total of 252 Agricultural Instructors in the Department, of which, around 125 were in extension work while the others were attached to the Research Divisions, the Government Farms, Experiment Stations, Farm Schools, etc. Clearly till about 1956, the number of extension staff in the field was far too small to make any kind of an impact.

18. Two other factors are worthy of record: Firstly, the basic qualifications from 1919 to 1957 for the recruitment of Divisional Agricultural Officers, was a Bachelor's Degree in Science or Agriculture. After recruitment they were required to obtain a post-graduate training abroad. With the abolition of the Divisional Agriculture Officer grade in 1957, the terms of recruitment for the District Agricultural Extension Officer grade were changed and recruitment was made entirely from within the existing Agriculture Instructor grade. This has resulted in a lowering of standards even though many District Agricultural Extension Officers coming from the grade of Agriculture Instructor have shown exemplary dedication and aptitude for extension work. The lowering of basic educational standards in a technical service must inevitably lead to a lowering of professional standards of service. These trends must be suitably modified in the coming years.

Secondly, in the early years it was expected that the Agricultural Instructor would be in direct contact with the farmer. Agricultural Instructors were and are still recruited with a basic qualification of a two-year certificate course; from 1884 —

1904 from the School of Agriculture, Colombo, and after 1912 from the School of Agriculture, Peradeniya. Between 1952 and 1957, about 70 Field Demonstrators were appointed to assist the Agricultural Instructors in carrying out their field work such as laying out demonstrations in farmers' fields, in organising field days, cinema shows, etc. This staff was recruited with the basic qualifications of the G.C.E. (O) and a certificate from the one-year course at a Practical Farm School. In 1957 when the staff of the Food Production Department was absorbed into the Department of Agriculture, about 500 Food Production Overseers came into the Department and a new cadre of Food Production Overseers was created in the Department. Many of the Food Production Overseers had no agricultural training whatsoever. The total number of Food Production Overseers including Field Demonstrators working in extension in 1959 was about 700. In practice the creation of a cadre of Food Production Overseers, now known as KrushiKarma Viapthi Sevakas, resulted in the juxtaposition of another generalist extension worker between the Agricultural Instructor and the farmer. The Food Production Overseer with lesser qualifications therefore became the direct link with the farmer.

19. Finally it would appear that the basic cause underlying this apparent *laissez-faire* approach to extension had been the absence until very recently of any real pressure for the development of agriculture in the domestic sector, a position that had arisen from a long established policy of investment in the export sector and of importing cheap food from abroad. Such a policy also necessarily prevented the formulation of well defined programmes for the development of the peasant sector which was primarily concerned with food production.

20. The discussion so far would indicate that the true condition for the growth of an effective organisation emerged only around 1963—64.

II. The Present Organisation for Agricultural Extension

21. It is necessary to describe the present organisation, staffing and functions of the Extension Division of the Department of Agriculture before proceeding to discuss changes that are necessary to fit this organisation more closely to the demands of the agricultural programme.

22. The Extension Division is at present organised in terms of a Head Office in Colombo and 22 Districts. Within each District there are three levels — the District Level, the Divisional Level and the Farm Unit (Village) level. (*The details are set down in Annexe* '2').

23. The Districts correspond with the Administrative Districts and are not agro-climatic divisions as were the Divisional Agricultural Officer Districts in the past. While this arrangement has its disadvantages in that it has led to an unbalanced distribution of staff in relation to agricultural potentialities of the country; it has had its advantages in that the planning and implementation of the current agricultural programmes have settled down on the basis of administrative districts. This base can be utilised for mounting comprehensive regional development schemes, as in fact is happening in the Mahaweli and Uda-Walawe Projects. There are, of course,

possibilities of re-demarcating the present administrative districts in a manner more consistent with the agro-climatic regions and indeed the development of agriculture as a whole. But this is a larger question of policy that is outside the immediate concern of this Chapter. The present organisation of extension in the Districts is briefly as follows:—

District Level

24. At District Headquarters each District Agricultural Extension Officer is assisted by a Senior Agricultural Instructor (the A.I. Headquarters). The District Agricultural Extension Officer works in close association with the District Agricultural Co-ordinating Committee and is responsible for the following functions within his District:—

1. assisting in the preparation and implementation of district agricultural production programmes covering rice, other field crops vegetables, fruits, minor export crops, livestock, etc;
2. formulation and supervision of extension education programmes including such activities as staff training classes, demonstrations, field days, discussion groups, etc;
3. organising and supervising 'adaptive' trials in farmers' fields;
4. organizing, co-ordinating and supervising the activities of Young Farmers' Clubs;
5. organizing and supervising Rural Home Management programmes;
6. organizing and supervising production in private seed farms and distribution of certified seed of all crops;
7. organizing and supervising the sale of agro-chemicals from the Extension Centres;
8. organizing and supervising of agricultural competitions and exhibitions;
9. administering the extension cadre in the district;
10. financial accountability and control;
11. attending all meetings and functions connected with the implementation programmes.

25. Each District Agricultural Extension Officer has an extension staff working under him in the field ranging from 6 Agricultural Instructors (A.I) and 29 Krushikarma Viapthi Sevakas (K.V.S) in the smallest District to 17 Agricultural Instructors and 118 Krushikarma Viapthi Sevakas in the largest Districts — (*See Annexe* '2'). In the larger Districts such as for instance in Anuradhapura, Kurunegala or Jaffna where there are between 15 — 17 Agricultural Instructors in the field the District Agricultural Extension Officer or the Agricultural Instructor (Headquarters) cannot possibly find the time to work closely with the Agricultural Instructor

going in depth into his programme of work, *i.e.*, closely supervising his work in relation to all the numerous technical problems that arise for which the Agricultural Instructor needs assistance. By the very nature of this organisation the contact between the Agricultural Instructor and the District Agricultural Extension Officer can only be a relatively superficial one and the result is that the Agricultural Instructor is often left very much on his own. At the best, the District Agricultural Extension Officer can meet his Agricultural Instructor about 2 or 3 times a month, once at the Monthly Conference at District Headquarters and once or twice a month in the field. Even in the smaller Districts the position is not much better in view of the multifarious duties the District Agricultural Extension Officer has to perform.

26. It will thus be seen that the District Agricultural Extension Officer has a wide range of functions. He has generalist 'technical' functions and is directly responsible, with the assistance of his Agricultural Instructor (Headquarters)—

(*i*) for the administration of the District;

(*ii*) for programming, supervising and evaluating programmes;

(*iii*) for advising and servicing the field staff and the Co-ordinating Committee on all the technical problems that arise in the District.

Clearly this load of work is more than what two officers can effectively handle especially in the larger Districts and is a problem that will become more acute as agricultural production in each District becomes more diversified and sophisticated.

27. During the last few years the principle of specialization at District Level was introduced and staff was posted to assist the District Agricultural Extension Officer in carrying out special technical programmes of importance in the District. For instance, an Agricultural Officer was posted to each of the following Districts:— Anuradhapura, Amparai and Kurunegala to work in other field crops. One Agricultural Instructor each was posted to Kandy, Nuwara Eliya, Bandarawela, Matale and Colombo for work on vegetables, and to Colombo for work on pineapples. An Agricultural Instructor was also posted to each District for Plant Protection. Experience during the last few years has indicated that this principle of strengthening the staff at District Level by providing trained staff to work in special fields of extension work is a correct one.

Divisional Level

28. The Agricultural Instructor is located at the Divisional Level. Each District Revenue Division is divided into one or more Agricultural Instructor ranges depending on the size of the Division and the importance of agriculture in the Division. There is at present a total of 202 ranges. The ranges are based on administrative rather than geographical or climatic divisions. Since the Revenue Divisions are based on population strength, it would not be realistic to provide Agricultural Instructors for all new District Revenue Officer Divisions as they are created as this would lead to a concentration of staff in the urban and more populated areas. The

distribution of Agricultural Instructors will have to be based more on the needs of agriculture in each Division.

29. The Agricultural Instructor is now a generalist dealing with all crops and livestock problems that arise within his range. He works in close association with the Divisional Agricultural Committee under the Chairmanship of the Divisional Revenue Officer and he is expected to execute all the functions of the District Agricultural Extension Officer and also train and supervise the work of the Krushi Karma Viapthi Sevakas in his range. He has to link himself with the M.P.C.SS and the Cultivation Committees and is expected to attend as many meetings of these organisations as possible. He has also to play his role in the Agricultural programmes of the schools in his range and in the activities of Young Farmers' Clubs. In addition to these educational activities the Agricultural Instructor is required to assist the Department of Census and Statistics in assessing the yields in paddy and other crops in general programmes and in special competitions and extension projects for the preparation of reports of the Department of Census and Statistics. He has to organise and conduct competitions on paddy and other crops. The production, purchase, certification and distribution of seed and planting materials and the sale of agro-chemicals and other argicultural requisites from Extension Centres are a further responsibility.

30. On the average, an Agricultural Instructor covers about 7,500 acres of paddy land, and has to deal with around 3,000 — 6,000 farm families, 20 — 25 Cultivation Committees, 25 — 30 M.P.C.SS and about fifty schools. He has on the average about 6 Krushi Karma Viapthi Sevakas working under him in his range.

31. Clearly, with the multifarious duties an Agricultural Instructor has to perform a 'range' of the present size is too large, if he is to understand the technical problems of farming and is to work closely with farmers and farmer organizations in improving their farming skills and knowledge. Each Agricultural Instructor is provided within his 'range' with a building known as the Extension Centre. It is expected that these Centres would serve as focal points for extension work in each range. The number of Centres classified according to the type of building is given below :—

Total Number of Extension Centres		**189**
Number in Department Extension Type-plan Buildings	23	
Number in other Government Buildings ...	45	
Number in Rented Private Buildings ...	121	

Many of the Centres are in private buildings which are either too small or too badly located to serve the purpose for which they are intended.

One of the factors that affects the work of an Agricultural Instructor is his mobility in the field. At present each Instructor is expected to have his own per-

sonal transport. The present position in regard to ownership of personal transport is given below :—

Number of Agricultural Instructors in Extension			**261**
Number owning Cars	...	...	65
Number owning Motor Bicycles	...	...	45
Number owning Push Bicycles	...	...	53
Number without transport	...	...	98

It will be seen that 50% of the Instructors do not have adequate transport facilities.

Village Level

32. Each Agricultural Instructor's 'range' is sub-divided into a number of Krushi Karma Viapthi Sevaka 'ranges'. There are about 4 — 12 Krushi Karma Viapthi Sevakas in each Agricultural Instructor range depending on the size of the range. As was pointed out earlier, the Krushi Karma Viapthi Sevaka has in practice become the final link in the extension organisation. There are at present 1,345 Krushi Karma Viapthi Sevakas in the Extension Division of which 1,091 are in the field including those in the Special Projects. Each Krushi Karma Viapthi Sevaka is a generalist and assists the Agricultural Instructor in carrying out all the functions assigned to the latter within the area of his range. The Krushi Karma Viapthi Sevaka has to work closely with the Cultivation Committees and the M.P.C.SS in his range and attend as many meetings as possible of these organizations. On the average each Krushi Karma Viapthi Sevaka has to deal with 700 — 1,000 farmers or 2 — 5 Cultivation Committees and about 4 — 10 M.P.C.SS and about 15 schools. Each Krushi Karma Viapthi Sevaka is expected to own a push bicycle for travelling about in his range. The present position in regard to vehicles is given below :—

Number of Krushi Karma Viapthi Sevakas in the Field	...	...	**1,091**
Number owning Cars	...	...	2
Number owning Motor Bicycles	...	...	3
Number owning Push Bicycles	...	...	943
Number without transport	...	...	143

Head Office of Extension Division

33. The functions of the Head Office are to assist in the preparation and supervision of the production and extension programmes, to supervise the work of the District Agricultural Extension Officers and to provide the necessary facilities for the field staff in carrying out their work. The Head Office organisation is as follows :—

1. Deputy Director of Agriculture in-charge of Extension
2. Additional Deputy Director of Agriculture in-charge of the subjects of Horticulture, Minor Export Crops, Young Farmers and Rural Home Management

3. Assistant Director of Agriculture for Special Projects in Colonization Schemes, Lift Irrigation Schemes, Youth Settlement Schemes and other Projects operated jointly with the Ministry of Lands, Irrigation and Power
4. Assistant Director of Agriculture in-charge of other Field Crops
5. Assistant Director of Agriculture in-charge of Minor Export Crops
6. An Agricultural Officer to service extension education and farmer training
7. An Agricultural Officer to service the paddy production programmes
8. An Agricultural Officer to service the Plant Protection Programmes and
9. An Agricultural Officer to service the Seed Production Programmes
10. An Assistant Director will be appointed in 1969—70 to take charge of Extension Education and Farmer Training.

34. There are in addition the other Units which work in close liaison with the Extension Division. They are —

(*a*) **The Extension Aids Unit** — This Unit which is in reality an Agricultural Information Unit is responsible for the following functions :—

(*i*) Publication of technical literature, magazines, booklets, leaflets, etc., for issue to extension staff and to farmers;

(*ii*) Preparation and publication of teaching materials for use of the extension staff in their extension work, *e.g.*, film strips, slides, photographs, posters, etc;

(*iii*) Agriculture education and propaganda through mass communication media such as the press and radio;

(*iv*) Organising of National Agricultural Exhibitions and Agricultural Shows and assisting District Staff in carrying out exhibitions and shows at District and Village Level.

The staff attached to this Unit at present consists of —

1 Agricultural Officer-in-charge who has been trained in this area of work,

5 Agricultural Instructors who have not had any special training, and

1 Photographer.

Approval has already been sanctioned for the appointment of the following staff to this Unit in 1969/70 :

One Agricultural Officer to specialise in the preparation and publication of technical publications,

One Agricultural Officer to specialise in the preparation of visual aids for teaching purposes, and additional staff such as a —

Photographer, Artist and Dark room Assistant are also being provided.

(*b*) **The Agricultural Economics and Farm Management Unit** — This Unit was established in 1968 and consists at present of two Agricultural Economists and two Agricultural Instructors.

The functions of this Unit as far as extension is concerned are as follows :—

(*i*) To conduct studies in the evaluation and selection of crops and livestock systems and combinations in order to maximise farm incomes;

(*ii*) Testing of Research findings of the Department with regard to their applicability on a profitable basis in the field before recommendations are released to the public;

(*iii*) Guiding farmers, particularly those participating in intensive programmes of development, as in Special Projects, in the use of simple farm records for regular evaluation of their farming business as means of testing their profitability and efficiency, and

(*iv*) Progressively introduce and popularise "Farm planning and Budgeting" techniques among the farming population of the country.

This Unit needs to be built up and considerably strengthened so that it can be a key instrument in developing economic farming systems in the different regions in Ceylon.

35. The discussion so far has been focussed primarily on the adult male farmer. Extension activities dealing with other members of the farm family, namely, rural youth and rural women need mention here:—

(*a*) Rural Youth Programmes

The work of the Department is centred round developing effective and active Young Farmers' Clubs composed of both girls and boys. The main objectives of this programme are to orient young farmers towards scientific agriculture and the use of modern techniques, to train them in the principles of farm management and marketing, in organising and running small enterprises on business lines and in developing a community approach to agricultural development. In its totality the purpose of the programme is to foster leadership coming forward from the youths themselves.

The youth programmes at present cover boys and girls who have left school and are between the ages of 15 to 25. The present strength of the movement consists of about 3,000 clubs with a total membership of about 100,000. A survey carrried out in 1968, however, showed that less than half these clubs were functioning efficiently and making an attempt to achieve the above objectives. The current emphasis is to build up and strengthen the movement by improving its internal organisational structure, in making them self-dependent and self-reliant by promoting and developing voluntary leadership at village level on which the continuity and success of any youth movement depends. The approach is not to attempt a simultaneous development of youth clubs all over the Island as was done in the past and which had led to a diffusion and waste of effort but to concentrate on selected areas. The programme will be gradually expanded as the knowledge and skills in organising and managing youth clubs develop. The responsibility for developing youth club activities is vested in the 'range' Agricultural Instructors and Krushi Karma Viapthi Sevakas. The District programme is co-ordinated and supervised by the District Agricultural Extension Officer. The Young Farmers' Club programmes are co-ordinated at Head Office level by a unit consisting of one Agricultural Officer and two Agricultural Instructors. One of the reasons why these programmes have not developed in the way that was anticipated was because the District Agricultural Extension Officer could not find adequate time to devote to this work. This year five Agricultural Instructors who have already been trained abroad in Youth work are being posted to the following Districts:— Colombo, Kandy, Kegalle, Kurunegala, Jaffna for full-time work with Young Farmers' Clubs. In subsequent years if this programme develops well more officers will be posted at District level, with the ultimate objective of providing each District with one full-time officer on Rural Youth work. The organisation at the National level will also be strengthened as the need arises.

(*b*) Rural Women's Programmes

An agricultural extension programme for rural women was begun in 1958 and a number of 'Female Demonstrators' (equivalent of the Krushi Karma Viapthi Sevaka) were appointed to work at Village level. This work was controlled at District level by the D.A.O/D.A.E.O. and at Head Office by the Deputy Director (Agriculture). The programme was terminated in 1964 as it was felt that no tangible results were being obtained. However, during the last 2 or 3 years the need for including rural women in an extension education programme has been strongly felt, particularly in the Special Project areas in Colonization Schemes where increased incomes from agriculture and improvements on the farms are not being reflected in corresponding improvements in the home and in the standards of home management and home-gardening. The Food and Agriculture Organisation was consulted in seeking a solution to this problem. A F.A.O. expert on Rural Home Management spent several months in Ceylon studying this problem. A new programme of work based on the recommendations of this expert was started in 1969. This programme which will be organised and co-ordinated by an Agricultural Officer with a special training in rural home management will be confined initially to the Special Project areas but

progressively extended to other regions of the country as farm incomes rise and investment opportunities in home and home-garden becomes a reality.

III. Basic Considerations and Proposals for Developing an Extension Organisation

36. In the first instance it would be necessary to define the specific role that extension will be called upon to play in implementing the present plan and then to examine the organisation, staffing and present functions in relation to carrying out this specific role.

37. The transformation of traditional agriculture into modern economic forms can only take place through the application of new (non-traditional) factors of production that are technically feasible and economically profitable under the specific conditions of each farm. This implies firstly, that the new techniques of production and new inputs have been found profitable in the local environment and secondly, that farmers would know to use these new factors effectively. These two aspects namely of testing research findings for local adaptability and of educating and training farmers in the use of these new factors of production are the primary levers of modernization and in essence are the specific functions of an agricultural extension service. Since increase in agricultural production is a result of the activity of farmers and farm families both individually and collectively, the involvement of the farmer in the development process, and an improvement in his knowledge and skills are central to the problem of increasing agricultural production. There is little doubt now about the fact that investment in farmers through education is a major factor in increasing the contribution of agriculture to economic development.

38. Bearing these considerations in mind, what would be the specific functions of extension in the context of implementing the present plan. This question has to be answered in the context of the current organisation and programmes for increasing agricultural production. During the last four years the Government has attempted to involve farmers' organisations such as Cultivation Committees and Co-operative Societies in the planning and implementation of Agricultural production programmes. For instance, the production programmes for paddy were drawn-up with the full participation of Cultivation Committees on the basis of Cultivation Committee areas. This meant that the requirements of agricultural inputs such as credit, fertilizers, agro-chemicals and equipment such as tractors, sprayers, dusters, etc., were estimated for each Cultivation Committee area before the commencement of each season. The activities of the various Government Agencies were co-ordinated to ensure that farmers knew what practices they had to adopt in order to increase production and from where they could obtain their agricultural supplies and equipment at the right time and in the right quantities.

39. In the planning and implementation of these production programmes the extension staff of the Department of Agriculture has a very special role to play. For instance, within each Cultivation Committee area in the case of paddy the extension staff has to perform the following functions:—

(*a*) An estimate has to be made of the physical potential of each tract in relation to soil fertility levels, water supply and drainage condi-

tions. The main limiting factors have to be identified and a long-term programme for their correction developed.

(*b*) In relation to the specific conditions of each tract — the present levels of paddy cultivation, the present levels of farmer skill and knowledge and skill of farmer organisations — a package of practices best adapted to the state of development of that tract has to be worked out and tested in the tract so that the production estimates and plans would be realistic and be within the reach of farmers.

(*c*) An extension education programme has to be formulated and executed to convince as many of the farmers in the tract that the variety of seed chosen and the accompanying cultural practices are in fact feasible and profitable. Specific training programmes for farmers have also to be carried out to demonstrate to the farmers the new practices or equipment with which they are not familiar.

(*d*) According to the progress of the educational programme which would be reflected in the number of cultivators indicating a desire to adopt new varieties and practices, it would be necessary to work out in association with the Cultivation Committees the inputs that would be required for each season's production programmes.

(*e*) Evaluating the progress of the programme with a view to identifying technical problems that need the further attention of research workers.

40. A detailed approach of this type will also have to be made in all the areas where diversification of agriculture is taking place and in the other field crops, vegetable, fruit production and other production programmes. In addition the extension staff will have to look into the more complex questions of farm management, *i.e.* of assisting individual farmers in developing their total holdings as economic units and in getting the best economic returns from available resources on their holdings. Interlinked with these educational programmes which are directed primarily at the adult male farmer would be the need to make a balanced approach to educating the farm family as a unit. The need for developing and integrating educational programmes for farm youth and rural women also is equally important in this context.

41. From the foregoing it is clear that critical responsibilities will be placed on the extension staff. It is also clear, as farming develops and becomes more sophisticated that there will be an ever increasing demand for improvements in farming technology and that the extension service will have to be geared to meet these demands. This will call for a high level of technical competence and new attitudes in an extension division that has been involved over a long period of years in service

functions such as distributing seeds, planting materials and agro-chemicals. While a greater emphasis on such supplies activities was necessary in the early stages of extension work the emphasis will have to be changed more towards getting the new technology to the farmers in the shortest possible time and in identifying technical problems in the field that need the further attention of research. Clearly, therefore, the main effort of extension in the Department of Agriculture over the period of this plan will have to be in farmer education and on the job of farming training.

42. The Department will not be able to dis-engage itself from the present supplies activities until satisfactory arrangements are made through other organisations in the Co-operative and Private Sectors to undertake these functions. The policy should therefore be to encourage such organisations to undertake supplies functions and for the Extension staff to perform only supervisory and liaison functions in relation to these matters. For instance, there is every likelihood of private nurserymen entering into the business of producing and supplying quality seed and planting material, if the necessary incentives are provided.

43. Experience gained during the last few years in the implementation of educational programmes indicate clearly that there is a very strong correlation between the effectiveness of the extension staff in direct contact with the farmers and the effectiveness of the extension programmes in activating farmers and hence in the progress of the agricultural development programmes as a whole. This direct link between farmer and extension worker is a primary and vital one. A properly trained extension worker is expected to bring to the farm level not only a body of technical knowledge which has been passed on to him from 'above' but also a perceptive intelligence that can see and assess the problems affecting the specific farmer on his farm and also of the farmers in a specific 'tract'. The need for this perceptiveness in the village level worker must be recognised in the philosophy and structure of extension itself. It means among other things that the training and servicing of the village level extension worker has to be conceived not in terms of a 'blotting paper' absorbing information handed down the line, but in terms of a capacity to detect and pose to higher levels the specific obstacles of extension in his particular range. In view of the above considerations in regard to functions of the staff in direct contact with the farmer, it is clear that the organisational structure of the extension service should be of such a type as to continuously sustain this link as a truly effective one. Proper organisational arrangements have to be made to ensure the following:—

(*a*) that the staff in contact with the farmer are continuously encouraged and maintained at the required technical and educational levels and that they are conditioned to detecting and posing technical problems which are specific to their respective areas.

(*b*) that their programmes of work are properly formulated, supervised and evaluated.

(*c*) they are properly serviced in regard to the identification and solution either directly or through further research of technical and other farmers' problems that arise in the field.

(*d*) that the required facilities are provided. Mobility of an extension worker is an essential requirement.

(*e*) that the morale of the staff is maintained.

44. To summarise, the knowledge and skills that farmers acquire through education and training in using modern methods of farming is a major factor in development. In carrying this new knowledge from research stations to the farmer the key person in the chain is the extension worker in direct contact with the farmer. At this stage of our development, it is this need to maintain a dynamic and effective link between extension worker and farmer that will largely determine what the structure and organisation of an extension service should be. The questions that arise are — What type of extension worker at village level? How is he to be kept at a 'high pitch'? How is he to be supervised and technically serviced? There are no hard and fast rules on which decisions in this matter could be taken. This is a question of adjustments in each country according to the levels of development of agriculture, the levels of sophistication of the farmers and farmers' organisations, the strength and effectiveness of the research organisation, the availability of trained man-power for extension, the financial resources that would be available and finally the nature of the agricultural development programmes and the kind of planning that is adopted. It should be borne in mind that the structure and organisation of the service should permit of changes alongside changing circumstances of the agricultural, social and economic conditions in a region or the country as a whole.

The Village Level Extension Worker

45. It is necessary at this stage to draw a distinction between extension workers at village level capable of carrying through extension education programmes in the terms stated earlier and general purpose workers at village level to assist the Cultivation Committees in carrying out production programmes for instance in processing and certifying applications for credit, fertilizers, etc., in organising cultivators' meetings and in following-up on cultivation schedules, etc. The concern here is with extension workers who have the training and capacity to carry through an effective extension education programme.

46. In deciding what type of extension worker is required at Village Level, the first set of questions that arise are — what should be the background and level of training of the extension worker in direct contact with the farmer? Should they be generalists or specialists? What should be the size of each 'range'? or how many farmers and farmers' organisations can each person effectively work with? Should they work with and through farmers' organisations? or deal directly with farmers?

47. In answering these questions, it should be borne in mind, as was pointed out earlier, that there can be no standard patterns or solutions for the country as a whole. The pattern would have to vary according to the nature and degree of development of agriculture in different areas and regions of the country. There is

at present no data on which definite answers can be given but nevertheless answers of a general nature which provide guide-lines can be presented for consideration. This is a field for further study which should be done by a research unit within the Extension Division of the Department of Agriculture in association with the Agrarian Research Institute.

48. At present there are two levels of extension staff in direct contact with the farmer namely, the Krushi Karma Viapthi Sevaka (K.V.SS) (Food Production Overseer) and the Agricultural Instructor. It was pointed out earlier that prior to 1956 the Agricultural Instructor was in direct contact with the farmers, that he was responsible for the extension programme and that he was given an assistant known as the "Field Demonstrator" to assist him in carrying out his field work such as demonstrations, etc. After the absorption of the Food Production Department and the creation of a cadre of Food Production Overseers a new grade of staff, the F.P.OO. came to be in direct contact with the farmers. The lines of responsibility for the execution of an extension education programme in the field therefore became diffuse and blurred. This is especially so in the large ranges where an Agricultural Instructor has 7 — 12 Krushi Karma Viapthi Sevakas assisting him.

49. In practice, however, it is becoming increasingly clear that in terms of the primarily educational functions required of an extension worker in direct contact with farmers, the background and level of training of the Krushi Karma Viapthi Sevaka is proving inadequate. In many areas farmers are now ahead of the Krushi Karma Viapthi Sevakas. At this level the extension workers should have a basic qualification of at least a 2-year certificate course from the School of Agriculture, Kundasale or an equivalent course. In the years ahead, as the levels of farming rise and farmers become more sophisticated in their demands from extension, it may be necessary to raise the basic qualification to a level still higher.

50. However, in terms of the immediate programme, the lowest level of staff on which the responsibility for the execution of an *extension education programme* should be placed is the Agricultural Instructor. The Krushi Karma Viapthi Sevaka should for the present assist him in executing this programme. This suggestion in fact amounts in the long run to replacing the Krushi Karma Viapthi Sevaka with a more qualified officer. Such a change has several implications. Firstly, it will involve an increase in the number of Agricultural Instructors and an increased cost to Government. Secondly, it would mean a gradual reduction in the number of Krushi Karma Viapthi Sevakas. Thirdly, the change must be made without demoralizing the Krushi Karma Viapthi Sevakas who will have to remain in service for many more years. This can be done by sending as many of the promising Krushi Karma Viapthi Sevakas as possible through the Diploma Course of the School of Agriculture, Kundasale and also by giving as many Krushi Karma Viapthi Sevakas as possible a better technical background in agriculture including a knowledge of elementary science, through massive in-service training programmes.

51. Nevertheless, in implementing agriculture production programmes, the need for a *general purpose worker* attached to each Cultivation Committee has been felt in most Districts and arrangements have been made to use K.V.SS., O.L.D.OO, and other village level workers for this purpose. It has often been suggested that there should be one extension worker per Cultivation Committee. This would mean that there should be around 4,000 extension workers. While this may seem desirable in principle, it is unrealistic to expect Government to bear the costs of such a scheme. In any event, the extension staff directly employed by the Department of Agriculture cannot be increased beyond a limit that is consistent with efficiency of management. Any future expansion of extension staff beyond limits that are 'safe' for the Department of Agriculture must be contained within the ambit of new Institutions. For instance, the hiring of extension staff by farmers' organisations such as Co-operative Unions is a necessary and possible development in this field.

52. At present the extension staff at village level in direct contact with the farmers are 'generalists'. That is they advise farmers on *all* aspects of agriculture on a farm. There has been considerable discussion as to whether the extension staff at this level should not be specialists, each dealing in depth with a different aspect of agriculture such as paddy, other field crops, livestock, fruits, vegetables, etc. At this stage in the development of agriculture in Ceylon, when the movement towards diversification and commercial farming is still in its infancy, it would be premature to think of having 'specialists' at the village level. The situation would in fact, be more difficult and complicated for the farmer, if he had to deal with several advisors on his farm. There are also insurmountable difficulties in switching on to specialization through the present extension staff. Such changes must however take place in the future as farming develops and diversified farming itself gives way to commercialised and sophisticated forms of specialised farming. It is not likely that such changes will occur widely and simultaneously during the period of this plan. Even so, this possibility will have to be borne in mind when the extension staff at the village level is being expanded.

53. In regard to the question of 'coverage', experience in other countries such as Japan, India, Taiwan and the Philippines has shown that increasing the intensity of coverage of extension workers in the field has resulted in technical improvements in farming provided other supporting institutions were not acting as obstacles. During the last three years the experience gained in the Special Projects in Colonization Schemes also supports this conclusion. However, no definite studies have been made in this country to determine the optimum area of coverage or the optimum number of farmers per generalist extension worker under different farming conditions in different areas of the country. While there are no hard and fast rules as to the number of farmers that an extension worker can effectively work with, the Food and Agriculture Organization recommendation is that in developing countries under conditions of intensive farming the number of farmers per extension worker should not exceed 500, while under less intensive conditions, the number of farmers should not exceed 1,000.

54. It is suggested the above guide-line for organising extension during this period of the plan be adopted keeping in mind the financial, administrative and man-power limits that Government can support. However research work into determining optimum 'areas' of coverage per extension worker will be undertaken during the period of this plan.

55. The practice of using progressive farmers as 'volunteer extension workers' to improve the efficiency and coverage of the extension service which is common in many countries could be adopted in Ceylon as well. Additional training facilities would have to be provided for such a scheme to work but it would reduce the strain on the exchequer and on the establishment. In studies conducted in countries such as the U.S.A. and Holland, it has been estimated that only about 50 — 60 per cent of the farmers actually obtain advice directly from the extension staff; the other farmers obtain assistance from leading farmers in the locality. The involvement of leading farmers can commence on an experimental basis in the more developed areas of the country. But in the new Settlement Projects such a system will not be immediately possible. In these areas, especially in view of the fact that most of the settlers would be learning new farming methods and systems of diversified and mixed farming, the intensity of coverage by extension staff would of necessity have to be greater at least in the initial stages of the development of the Project.

56. In regard to the last of the questions posed in this discussion on village level workers, it is relevant at this stage to draw attention to one very important fact. Under the topographical, social and rainfall conditions that obtain in Ceylon and under farming systems where small-holders are in a majority, the demands of efficient soil and water management and conservation make the isolation of the small farm as a physically, socially and economically separate and independent unit almost impossible. The small farm is a physical part of a larger tract and farming under these conditions is both an individual and collective act, in which the development of each farm has always to be considered in relation to the development of the tract as a whole. The significance of this conclusion is that extension will have to work with groups of farmers as well rather than concentrate on working entirely with individual farmers independently of the group.

(*a*) Maintaining Technical Competence of the Village Level Worker

57. As pointed out earlier, it is vitally important to ensure that Extension Staff are kept continuously up-to-date with the latest technical information and are properly oriented towards the objectives, strategy and requirements of national plans. This cannot be left to the staff to acquire on their own initiative and positive arrangements have therefore to be made for this purpose. These objectives can be achieved in one, or all of three ways:—

(*i*) By making a large and substantial investment in In-service training with clearly defined objectives and proper course content.

(*ii*) By making a bigger investment in an Agricultural Information Unit which will be responsible for the ready availability of

technical literature prepared especially for the use of the field staff, based specifically on local data and within local conditions.

(*iii*) By making regular arrangements for Workshops, Seminars, discussion groups and visits to research stations, etc.

58. The present arrangements are not completely adequate. In-service training is dealt with in the section on Training. The subject of Agricultural Information will be disussed in more detail later in this report.

(*b*) Formulation, Supervision and Evaluation of Extension Education Programmes at Village Level

59. The functions of an extension worker in direct contact with farmers were set out earlier in this discussion. The success of introducing a new technology into farming depends largely on the correct identification of the real priority technical problems of farmers, the technical and economic feasibility of the 'solutions' that are being proposed and on the nature and effective execution of the extension educational programmes that are designed to convince farmers of the value of these solutions. These extension programmes have to be formulated and executed with the same kind of precision with which experiments are designed and carried out in research programmes, if they are to be truly effective.

60. Clearly an extension worker at village level cannot be expected to carry through such programmes entirely on his own. He will have to be assisted in formulating and evaluating these programmes and his work will also have to be closely supervised to ensure that the programme is properly executed.

61. As was stated earlier, the District Agricultural Extension Officer especially in the larger Districts, is unable to devote adequate time to each Agricultural Instructor in the field, going into his work in depth and it does appear that arrangements for strengthening the supervision within each District are required. There are two alternative ways of doing this, firstly, to increase the supervisory staff at District Headquarters and secondly, by dividing the larger Districts into Divisions. The latter alternative is preferable as it would place the supervisor in closer contact with the field staff and field problems and would reduce to some extent the present remoteness of the District Headquarters from the field. The value of such a decentralization has already been proved in the Special Projects where the Project Managers have been able to make a considerable improvement in the extension education programmes, and consequently on the levels of farming.

62. In determining what the size of such an 'operational area' of supervision should be or in other words in determining how many officers one supervisor can effectively manage in relation to an area of land, there is no experimental data on which such a decision can be taken. Here again the experience from the Special Projects where it was found that a supervisor can manage about 4 — 6 Agricultural Instructors and 12 — 15 Krushi Karma Viapthi Sevakas over an area of 10,000

acres of paddy land, could be used as a guide at least in those areas where extensive development programmes are in operation or are contemplated. Undoubtedly, the 'operational area' would depend on the agricultural potential of any given area, and on the intensity of the development programme and it is not suggested that arrangements for supervision should be introduced uniformly over the whole country but only in those areas where the programmes demand that such steps be taken.

63. An increase in the coverage of supervisory staff is required in Stage I of the Mahaweli Project, the Uda-Walawe Project, the Project for the intensive development of Colonization Schemes, the Major Irrigation Schemes outside the Colonization Schemes, the Crop Diversification Projects on tea and rubber lands, the proposed Projects for the development of Other Field Crops, and in the project areas for the intensive development of fruits, vegetables and minor export crops. In the other areas of the country the 'Supervision coverage' will have to be worked out according to the actual need.

64. It is proposed that these appointments be on the Agricultural Officer Grade in the Department of Agriculture and that recruitment to this grade be made from candidates with a B.Sc. degree in Agriculture and from among promising Agricultural Instructors.

(*c*) Technical Servicing of Extension Staff at Village Level

65. Turning to the question of technical servicing of staff in the field, as stated earlier, it is anticipated that during the period of this plan there will be deep qualitative changes in agriculture in this country. The transition from subsistence to commercial farming is already taking place and more and more farmers are beginning to think of their entire land holdings as economic and business units. It is expected that on the well-drained paddy lands, the marginal and uneconomic rubber and tea lands, the wetter coconut lands and on land that is presently under chena cultivation, the present systems of agriculture will give place to new systems of family farming based on diversified cropping and mixed farming. These changes will place a host of new problems on the present Government supporting systems for credit, supplies, research, extension and marketing. As far as the extension service is concerned, it is almost certain that the Extension Division as presently organised will not be able to meet the challenge.

66. These changes will involve a whole new range of farming operations, new crops, new methods of crop, soil and water management and crop protection, the use of new farming tools, equipment and machinery, new methods of crop processing, of pasture, fodder and livestock management and above all it will involve new approaches to farm management, of treating the whole farm as a single business unit and of selecting combinations of crop and livestock enterprises best adapted to the specific areas in which individual farms are located.

67. Clearly, if the rate of development is to be kept as high as possible both the field extension staff and the farmers would need to have expert and specialist advice and assistance in these various fields of activity. On the other hand, it cannot be

expected that the staff in the field in contact with the farmer will have the knowledge to carry by themselves all the information that the farmer will require. Nor can it be expected that the District Agricultural Extension Officer or Agricultural Instructor (Headquarters) will be able to manage this task themselves in view of supervisory and other tasks that they already have to perform. On the other hand, it is clear that the research staff cannot also be expected to carry out these advisory functions if the job is to be properly done, particularly, if it is going to take up most of their time as it almost certainly will. While it is very desirable that research staff must spend a part of their time studying problems and meeting extension staff and farmers at first hand in the field, it would be unrealistic to place additional official responsibilities on them which could actually affect their research work adversely.

68. The time has now come for the creation of a new cadre of crop and livestock production specialists 'Subject Matter Specialists' in different fields of work who will be responsible in their respective specialities for servicing the extension staff in the field. They will assist the field staff in identifying technical problems, in finding practical solutions to these problems, in organising farmer training classes and in providing the technical information for inclusion in publications for use by extension staff and farmers. By the nature of their work these specialists will form a direct link between research and extension, carrying research results to the field on the one hand and feeding back field problems for solution on the other. While the principle of using specialists is not an entirely new one, (there are crop production officers in tobacco, vegetables, other field crops and plant protection), the absence of a regular organised and specially trained cadre of specialists has been a serious gap in the extension organisation and it is expected that the creation of such a cadre would greatly improve the quality and effectiveness of the extension service.

69. The immediate need would be for 'Specialists' in the following fields:—

1. Soil and Water Management including Soil Conservation
2. Agricultural Economics and Farm Management
3. Farm Machinery
4. Plant Protection
5. Field Crops — for rice, for other field crops
6. Horticulture (fruits and vegetables)
7. Minor Export Crops
8. Livestock
9. Home Economics
10. Rural Youth Work.

There has been considerable debate as to whether Subject Matter Specialists should be located within the Research or the Extension Divisions. There is no uniformity in other countries. In some Extension Specialists are located in the Extension Service and in others in the Research Service. In the context of Ceylon agriculture, it would be desirable to locate these Specialists in the Extension Division and ensure that they work closely with the Research Stations. This arrangement

would ensure that the 'Specialists' become an integral part of the organisation for implementing agriculture programmes at District and Regional Level, which would keep them in close touch with the field problems and production programmes. These Specialists would be located at two levels, at the District level where the emphasis should be mainly on crop and livestock production and at the Regional level where the emphasis should be on subjects such as soil and water management, farm machinery, agriculture economics, etc.

70. However, these Specialists should be in very close touch with the research work in the region in which they are working and would at the same time take an active part in training extension staff and in assisting them to train farmers in their specialities. It would be advantageous to locate them at the proposed regional training centres. (See section on Education and Training). This would mean that there would be six regional teams of Subject Matter Specialists covering the following regions — the North Central Dry Zone, the Southern Dry Zone, the Mid-country Zone, the Hill-country Zone, the Low-country Wet Zone and the Dry Zone latosol region. The regional agricultural Centres would cover the Uda-Walawe and Mahaweli Project areas as well.

71. For a proposal of this nature to be effective, it would be necessary to recruit highly qualified and trained staff with graduate or post-graduate qualifications and because of the present shortage of qualified staff this will have to take place over an extended period of years, the immediate need for specialists could be filled by recruitment under Foreign Aid programmes of Specialists from abroad.

The Divisional Level

72. The Agricultural Instructor at present operates at the Divisional Level while the Krushi Karma Viapthi Sevaka is at the Village Level. It was pointed out earlier that two levels of staff in direct contact with farmers is unsatisfactory and it was proposed that in the long run there should be only one level of Extension staff in contact with the farmer. It was also suggested that the responsibility for the operation of extension education programmes should be placed at the Divisional Level. Clearly therefore the 'Divisional Level' will assume a far greater importance than in the past. It will in fact become the *operational unit* for the execution of extension programmes while the District Office functions will be co-ordination, servicing and supervisory.

73. It should however be borne in mind that in the long run as farming becomes more specialised and sophisticated the need for providing extension staff at this level to work in separate branches of agriculture — *e.g.*, rice, other field crops, horticulture, floriculture, livestock, etc. would arise. This staff would have to work as a team under the direction of the Divisional Extension Supervisor. It is not likely that this development will take place on a large scale during the period of this plan but provision will have to be made for it in some areas of the country. Looking further into the future it is clear that the need for general village level staff will also

gradually wither away and that the final position would be one in which there would be only teams of specialised extension staff working at Divisional Level. Such an eventuality will also have to be taken into consideration when village staff are being expanded.

The District Level

74. While it was earlier suggested that the principle of having separate extension staff working in special fields of agriculture should not be introduced for the present at village level and that it should only be gradually introduced at Divisional Level the need for production officers for specific crops at District level is a real and urgent one. During the period of the last plan the value of providing special staff to work in the branches of agriculture such as other field crops, vegetables and plant protection has been amply demonstrated by the progress made in these branches. Such a trend is also in keeping with the demands of regional specialization and this principle of appointing crop and livestock production officers should be further extended in those areas that require additional staff according to the demands of the plan. It is proposed that crop production officers be appointed for rice, maize, other field crops, tobacco, potatoes, vegetables, fruits and minor export crops. The work of these officers could be linked with research through the formation of 'Commodity' Committees referred to earlier in the section under Research.

75. The District Office is also weak on the supervisory and administrative aspects of its work. The appointment of a District Agricultural Extension Officer to each District on the Agricultural Officer Grade at least in the larger Districts would free the District Agricultural Extension Officer from a great deal of routine work and enable him to concentrate on the more important aspects of his work.

Headquarters of the Extension Division

Servicing of Extension Staff

76. The present functions of the Headquarters of the Extension Division were set out earlier in this report. In general terms, the present staffing and organisation is satisfactory and no major changes appear necessary except in the strengthening of the field crops and horticultural sections and the Extension Aids Division.

Agricultural Information Division

77. The ready availability of relevant and topical teaching materials and teaching equipment, for example—slides, film strips, films, bulletins, posters, leaflets, projection equipment, etc., adapted to the requirements of the agriculture programmes in different areas of the country is a vital link in the extension programmes, especially in organised farmer training classes. This aspect of the work has not received adequate attention in the past and recent proposals to place the responsibility for the preparation and printing of teaching materials under an Assistant Director for Extension Education and Farmer Training and to expand the staff in the Exten-

sion Aids Division to undertake the production of teaching materials would go a long way towards solving this urgent problem. Furthermore, the education of farmers through mass communication media such as the radio is becoming increasingly important. The Ceylon Boadcasting Corporation also intends establishing about 9 regional transmitting stations in different regions in the country over the next few years. In order to make full use of these facilities it would be necessary for the Department to appoint and train a number of Agricultural Instructors who will be located in the different regions and who would work full-time on radio programmes. They would be responsible for preparing the regional agriculture programmes in association with the Ceylon Broadcasting Corporation. The staff required to develop these programmes could be provided and trained over the next three to four years.

78. The following proposals are made in regard to Agricultural Information:-

(*a*) The name of the "Extension Aids Division" should be changed to "Agriculture Information Division". This would make its functions more specific and would be more in-line with the specialised nature of the work this Division has to perform.

(*b*) The appointment of an Editorial Board consisting of representatives from the Research and Extension Divisions of the Department and from the Faculty of Agriculture, University of Ceylon to 'vet' the technical material before it is passed on to the Information Unit for processing and publication.

(*c*) The staff of the proposed Information Division especially the Publications Section, the Photographic Section and the mass communication section should be further strengthened.

Research in Extension Education Methods and Techniques

79. There is a real need for establishing a small unit within the Extension Division that will undertake, in association with the Agrarian Research and Training Institute, a programme of research with the objective of developing effective methods and techniques of extension work that would be adapted to the different social and economic conditions that exist in the country. The present hit or miss methods result in a considerable waste of time and effort and must now be placed on a more scientific footing. It is therefore proposed that a Unit consisting of one Sociologist and one or two Extension Specialists be established during the period of this plan. This Unit will also act as a liaison with the Agrarian Research and Training Institute.

Rural Youth and Women's Programmes

80. The principle of treating the whole farm family as a single social economic production unit is a correct one and the present approach of operating these programmes in selected areas where there is a specific need for them is also appropriate.

The extension programmes for rural youth and rural home management that have been started by the Department of Agriculture should be continued and gradually expanded as experience in developing and executing these programmes grows and as the need for these programmes expands.

81. Two factors must be taken into account when developing these programmes and in expanding staff, firstly, the youth programmes have to be planned and executed within the wider framework of development plans of the National Youth Council and secondly, the women's programmes must be closely co-ordinated with the work of the Rural Development Department, the Health Department and other voluntary organisations such as the Mahila Samithiya.

82. A supporting research and experiment programme will also have to be established for both.

FACILITIES FOR STAFF IN EXTENSION

The Extension Centre

83. Each Agricultural Instructor is at present provided with an extension centre building as a base for this operation. The principle of providing a centre is of great value. All too often the extension centre is regarded as merely an Office for the Instructor but in fact it should serve a more functional purpose and should be looked at in the same light as a clinic or dispensary in the Health Service. It is necessary to convert all extension centres, in a phased programme over the next five years, into really functional units. The functions of a centre could be briefly stated. It provides a central location to which farmers would come when they have difficulties, a place at which they could obtain technical literature and also see new varieties of seeds, specimens of insect pests and diseases of crops, new agro-chemicals, fertilizers and agricultural equipment. The centre is also a location at which farmers' meetings, discussion groups, film and slide shows could be regularly organised. The centre also provides an emergency pest control service in the case of an epidemic out-break of pests and diseases in the area. It has been pointed out earlier that many extension centres are located in buildings that are quite unsuitable in quality, size and location to be of real functional value to the farmers. Adequate funds should be provided for a phased programme of building and equipping new extension centres.

Mobility of Extension Staff

84. One of the factors that greatly affect the value of an extension worker is his mobility in the field. In extension teaching the teacher goes to his students. His effectiveness varies directly with the number of students he contacts each day. Seen in this context a vehicle becomes an important part of his teaching equipment. The extension staff cannot be expected to do an effective job depending entirely on public transport. The position with regard to personal transport is at present far from satisfactory and some positive steps will have to be taken to correct this posi-

tion. The question of transport is a general problem affecting field officers in all Government Departments but specific recommendations are made here in relation to the Extension Division of the Department of Agriculture.

85. As far as possible, arrangements should be made to provide field staff of the Extension Division with personal transport, Agricultural Instructors with either motor bikes or cars and Krushi Karma Viapthi Sevakas with motor scooters.

86. It is necessary to provide 2 — 3, 4 — wheel passenger vehicles in each of the smaller Districts and 4 — 5 passenger vehicles in the bigger Districts. Each District should have at least 1 Cinema Van, while it may be necessary to provide 2 Cinema Vans in the larger Districts such as Kurunegala, Anuradhapura and Amparai.

A CO-ORDINATED EXTENSION SERVICE IN AGRICULTURE

87. The discussion of agricultural extension in this Chapter has been concerned largely with the extension activities of the Department of Agriculture. This has to be so for several reasons explained in other places. Nevertheless the perspectives in agricultural extension during the period of the present plan would be faulty and incomplete without referring even in brief to the nature of agricultural extension carried out by other Departments, the nature of the unities that should be established between extension in such Departments and the Department of Agriculture and the nature of the organisational problems that they pose.

88. For instance the cadre of Agricultural Instructors in the Department of Agriculture and the cadre of Colonization Officers in the Department of the Land Commissioner have the same basic qualifications at recruitment. Both grades of officers have also been working in development activities in the rural areas. Nevertheless there has been a functional differentiation in the duties that they were called upon to perform. These differentiations have over the years naturally led to the development of different orientations that have been built up as a consequence of training on the job. The Colonization Officers on the whole have developed experience and expertise in problems connected with land administration and the supervision and regulation of the several legislative enactments basic to the area of land development and settlement. The Agricultural Instructor on the other hand has little or no knowledge of these matters. His orientation and training has been consciously directed towards increasing productivity through the package of practices and inputs normally associated with agricultural production. This broad distinction would hold true for the country as a whole. The differentiation has over the years tended to take a special emphasis in the major Colonization Schemes largely because the problems of agricultural extension focus themselves with greater intensity in these Schemes where capital investments by way of land, water and human resources were made as part of deliberate policy.

89. It is now generally recognised that the major Colonization Schemes in the Island are not only Schemes for transference of population from the over popula-

ted areas and the distribution of land to the landless in an equitable manner, but also as primary centres for developing a modern agriculture and a community within the rural sector.

The practical implementation of this realization during the last few years has been the emergence of the new institutional form of the Special Project in major Colonization Schemes. The objectives of these Projects, the perspectives they offer during the period of the plan and the role they will be called to play have been discussed in Chapter I. For the present purpose it would suffice to mention that the functional differentiations between the Agricultural Instructor and the Colonization Officer, and even between the lower levels of the Krushi Karma Viapthi Sevaka and the Land Development Overseer, have been brought together within the framework of the Special Project. Attempts are now being made to integrate and iron out these functional differentiations as far as possible in relation to a programme of agricultural production. While these efforts have achieved a measure of success a more thorough-going approach originating initially in major Colonization Schemes will be required if the extension workers employed by Government are to be deployed to the fullest advantage of agricultural development. It is not possible to map out in detail the various steps by which this can be achieved. Nevertheless certain guidelines for policy can be indicated here.

90. For instance the supervisory and regulatory functions of land administration should be relatively less in volume and importance in major Colonization Schemes which have been established many years ago. In such cases it should be possible for just one or two officers working in a Special Project to attend to the totality of land administration falling within the project area while all others concentrate on community development based on an agricultural production programme. This will entail a reorientation and retraining of Colonization Officers for agricultural extension in the same way as that of Agricultural Instructors. The responsibility for such retraining must be vested with one authority, and in the circumstances now available, that authority should be the Department of Agriculture. The In-service Training Institute at Gannoruwa run by the Department of Agriculture is serving a very useful purpose in improving the technical competence of agricultural extension workers in that Department. There is no reason why Colonization Officers, O.L.D.OO and indeed any other cadre that can be deployed for agricultural extension work should not be trained at this Institute. If this principle of training agricultural extension workers for village level work by the Department of Agriculture is accepted, it will be necessary to allocate extra resources to that Department for discharging that responsibility.

91. In the case of new areas of settlement such as Mahaweli and Uda-Walawe the problems of land administration will occupy a prominent place in the early years. In such situations the present Colonization Officer of course with a brushing up of the technical aspects of agriculture will be needed in the new settlement areas. He will naturally have to be supported from the very inception by his colleague who is

specializing in agricultural extension as such. The relative numbers with skills in the different functions to be deployed in a given Scheme or given area is a matter to be determined in implementation. The joint committee of the Ministries of Agriculture and Lands guiding the development of Special Projects should be the authority for deciding on the numbers of Colonization Officers versus Agricultural Instructors or K.V.SS versus O.L.DOO. in the Special Projects in Colonization Schemes. In areas falling outside major Colonization Schemes these decisions will have to be taken by the Ministry of Agriculture and Food in consultation with the Ministry of Lands and the Government Agents responsible for the respective areas.

92. The functional differences between Agricultural Instructors and Colonization Officers appear in somewhat the same way in the case of Agricultural Instructors and Divisional Officers of the Department of Agrarian Services. Here too, the lower levels of officers in the Agrarian Services Department are also differentiated by function from the K.V.SS.

93. Many of the Divisional Officers and the Agricultural Instructors have the same basic qualifications at recruitment. Both groups of officers have also been working in development activities in the rural areas. The Divisional Officers have experience in the administration of the Paddy Lands Act, the servicing of Cultivation Committees, minor irrigation and the Guaranteed Price Scheme. The Agricultural Instructors on the other hand have less knowledge and experience of these matters.

94. In this instance also, it would be advisable to follow the guide-lines for co-ordination suggested earlier in respect of Agricultural Instructors and Colonization Officers.

95. The role of the Co-operative Society and the Co-operative Department will require special scrutiny and evaluation in the context of agricultural extension. The report of the Laidlaw Commission (Sessional Paper 11 of 1969) has made comprehensive and far reaching recommendations regarding the co-operative sector of the country. While these recommendations await consideration, it can be safely pointed out that extension work in the field of co-operatives has been a gravely neglected area in the past. At the District and village levels the activities of the Co-operative Department have now been separated into the functions of audit and development. The content and objectives of the auditing programme are clear and capable of evaluation. The same cannot however be said of the activities described as the 'development' function. In practice, this means largely the supervision of the agricultural credit transactions channelled through the Co-operative Societies. These undoubtedly are important activities, but the policies so far followed have not given due weightage to education and extension in the co-operative sector. Unless a heavy emphasis is given to the educational and extension functions of the Co-operative

movement, it will be difficult to build the capacity of the Co-operative movement to shoulder the responsibilities of a developing agricultural programme.

96. During the period of the present plan increasing emphasis will have to be placed on community development based on rural institutions. Such efforts will extend outwards from the intensification of the production programme itself. Unless this approach is made the production programme itself may not receive stability and prove to be an enduring economic base for the social changes which must inevitably take place if the agricultural sector is to be modernised. A co-ordinated agricultural Extension Programme must therefore have as one of its principal objectives, the development of farmers' institutions and the managerial and technical skill of farmers themselves. As these levels rise it should be possible to withdraw village level extension workers for work in other less developed areas of the Island. A policy objective of this nature has become all the more urgent because it is no longer possible to think in terms of large increases in extension cadre under the direct employment of government agencies. Considerations of finance as well as management require that departments of Government connected with agricultural extension cannot carry beyond certain numbers in the cadre. The need for extension workers over and above the staff directly employed by Government agencies must be found by utilising the farmers' institutions with progressive farmers functioning as agricultural extension workers at village level. The Extension service of the Department of Agriculture will have to gradually become a service consisting primarily of highly trained specialist extension officers.

97. Special arrangements for a co-ordinated extension service will be required for the crop diversification programme on uneconomic tea and rubber lands. This programme will involve the private sector, the three Research Institutes incharge of Tea, Rubber and Coconut; the Department of Agriculture, the Department of Trade and Commerce and the Ministry of Planning. A Standing Committee for co-ordinating this work has been established in the Ministry of Agriculture and Food. The development of pilot projects in crop diversification will have to be carefully tailored to harness the resources of the different organisations involved in a project of this nature. Furthermore, the crop diversification programme itself must form part of the District programme under the leadership of the Government Agent.

98. The Uda-Walawe Authority has been statutorily vested with the functions of agricultural research and extension in the areas falling under its authority. Since, however, the facilities and the resources in these fields are available largely with the Department of Agriculture, special arrangements are being made for the Department of Agriculture to recruit officers and release them for work under the Uda-Walawe Authority. This arrangement is expected to provide a general framework for the co-ordination of research and extension between the Uda-Walawe Authority and the Department of Agriculture.

Summary of Total Technical Staff Requirements for Agricultural Extension including Mahaweli and Uda-Walawe Projects and Special Projects in Colonization Schemes

1.	*Agricultural Officer Grade*	
	(*a*) Subject Matter Specialists	56
	(*b*) Crop Production and other Specialised Posts ...	54
	(*c*) Extension Supervisors	95
	Total	205
2.	Agricultural Instructors	387
3.	Krushi Karma Viapthi Sevakas (mainly for Mahaweli Uda-Walawe and Special Projects in Colonization Schemes)	704 +

\+ If a decision is taken to run down the grade of K.V.S. the number of Agricultural Instructors will have to be increased.

Details of the phasing of staff requirements are given in Annexe 3.

CHAPTER II

AGRICULTURAL EDUCATION AND TRAINING

The extensive scope of the subject of Agricultural Education and Training makes it necessary to place this discussion within some limits which may seem arbitrary but nevertheless appropriate to the immediate purpose of this plan. The loss in comprehensiveness entailed in these limitations may well prove a gain in the intensity of understanding within the restricted field. This approach is being made not unmindful of the larger and indeed fundamental links between education and society, between agricultural education and general education and of the many meanings embodied in the concept of training. All these themes have a seminal influence on the preparation and execution of a development programme for the Island as a whole. In fact it is envisaged that as the Agricultural Plan gathers momentum in implementation, it will be necessary and possible to harmonise the objectives and proposals that are presented here with areas of education and training that have not been taken into account in this presentation.

2. The first and most important limitation that has been adopted here has been to restrict the proposals to those persons who are directly and immediately associated with the implementation of this plan. The first of these groups are the farmers themselves who must in the final analysis achieve the production targets and farming systems that are envisaged in this plan. Considerable attention has, therefore, been paid to the proposals embodied here for farmer education and training. The second group can best be identified as the salaried functionaries who are expected to labour in the implementation of this plan.

3. In addition to the specific proposals made in respect of the two groups mentioned above, a general examination of the problems of training of staff for the agricultural sector from the Practical Farm Schools, School of Agriculture, Kundasale, the Junior Universities and the University has been undertaken. In addition a specific examination of recruitment and promotions in the Department of Agriculture and recommendations of a general nature that should be followed have also been made.

4. Finally recommendations regarding the policies that should be followed in providing post-graduate training to those who joining the Department of Agriculture have also been made.

5. In confining attention to the two groups referred to above the subject of agricultural education and training imparted in the Secondary Schools, Junior Universities, Universities and certain private institutions have had to be excluded

even though they have a bearing on these proposals. There are also other reasons for not entering into an evaluation of agricultural education in the Secondary Schools and Universities. One is that Agricultural Education and Training in the context of the Schools and Universities is too vast a subject to be taken up under the somewhat different theme of Agricultural Research, Education and Training. The other is that the subject of Agricultural Education is a comparatively new one in the Schools and its scope, objectives and methodologies are still under discussion and experimentation and will necessarily take time to mature.

6. While recognising these difficulties it must be made clear that this plan seeks to highlight directly or indirectly the new systems in domestic agriculture that are to be developed in the future and the kinds of qualifications and aptitudes that will be required of those leaving the Schools and Universities to enter the agricultural sector as farmers or salaried functionaries. It is envisaged that the authorities responsible for agricultural education in the Universities and Schools will take these guide-lines into consideration in formulating their plans so that academic education in agriculture will be dove-tailed to serve the needs of practical agriculture.

7. It is well known that the ideas of farmer education and training are basic to the theory and practice of agricultural extension in most parts of the World. There are some who even think of extension solely in terms of education. The introduction of new techniques and new systems in agriculture involve difficulties which are qualitatively different from those faced by industry. On the whole advances in industrial technology can be transferred from one area of a country to another area or even across national boundaries with a fair measure of confidence that what works in one place will work reasonably well in the other. This does not hold good for agriculture. Whereas in industry the human factor is being increasingly controlled by the pre-determined efficiency of machines, the application of industrial technology to agriculture has not reduced the importance of the farmer himself in the process of production. It has rather moved in the direction of making new and different demands of the farmer. In addition to these factors, if it is realised that in Ceylon agricultural productivity in the non-plantation sector depends upon the decisions of thousands of individual farmers who work small-holdings, the central importance of the farmer himself in any plan for generating agricultural growth must be conceded. High priorities in investment must therefore be channelled for farmer education and training during the period of the present agricultural plan. The importance of farmer education has been recognised in principle in Ceylon for a long time but unfortunately there has been a substantial time lag between the idea and its proper fulfilment. The reasons for this are not far to seek. During the period that Ceylon was ruled by colonial powers agriculture was largely understood as export agriculture based on plantations. The ethos of the colonial period remained for a long time even after Ceylon attained independence in 1948. In the post-independence era when emphasis in the field of domestic agriculture was placed on major Colonization Schemes located largely in the Dry Zone of the Island, the primary objective appears to have been one of transferring and settling population

on vacant Crown land rather than one of increasing productivity of the lands that were so settled. With the increasing emphasis on domestic agriculture, the question of farmer education and training has also received increasing attention. A considerable amount of effort has been devoted to this field in recent years but the programmes now under way can only be considered as a beginning of a sustained effort linked to the larger objectives of agricultural development.

8. The following is a resume of the programmes of *farmer education and training* that have so far been undertaken by government agencies directly concerned in increasing agricultural productivity. In presenting this summary it must be remembered that in a general sense every type of extension activity undertaken by governmental and non-governmental institutions can be accorded the status of farmer education in that they all seek to improve the knowledge and skill of the farmer. Experience, specially in recent years, has shown that this type of general extension is in fact diffuse extension and that its value as a programme of farmer education is a gravely limited one. As such, the concern here is with those programmes that seek to impart a special agricultural education to the farmers in a formal and intensive way.

9. The Department of Agriculture has during the last two years concentrated its attention on providing one type of formal course in farmer training. These courses are each of one day's duration and have been conducted in different parts of the Island. This training programme is organised round a single objective, namely, to identify one or two practical problems which are of immediate concern to the farmers of the given localities and then educating them on ways and means of overcoming these obstacles. The classes are coupled with practical demonstrations in the field. The programme also allows for conveying information on a few related topics which are subsidiary themes incorporated into the main objectives of the programme. This approach has demonstrated several advantages. It has been easy to secure farmer response because the programme is a strictly utilitarian one designed to meet a problem that is worrying the farmers themselves. This approach has also enabled the Department to avoid the dangers of running training programmes which are over-theoretical and are aimed at a level above that of the farmers. Finally, the programme has made it necessary for the extension staff of the Department to identify the more important problems restricting productivity and to equip themselves with the knowledge for teaching the farmers. So far 71,000 farmers have participated in this programme which is proving a popular one. The organising principle of this programme can be explained by this illustrative example. In one district where transplanting paddy had been practised for years, it was found that the depth of planting was too deep and was proving an obstruction to the attainment of higher yields. This subject was the main topic around which a one-day programme of training and demonstration was organised in the area. The discussions and the field demonstrations sought to convince the farmers of the dangers inherent in deep transplanting. This method of one-day courses in farmer training is still in the early stages of development. With greater information regarding technical

problems in the field and the availability of more trained staff to broaden and intensify these programmes, this method may well be consolidated as the basic method for farmer training. In addition to this programme, the Department of Agriculture has also recently organised farmers on one-day visits to the important research stations of the Department so that there would be closer links between research and extension and a better appreciation on the part of farmers as well as research officers of their mutual problems.

10. The Department of Agrarian Services has a scheme of training for members of Cultivation Committees. It is a two-day training course with a fixed curriculum. About ten Cultivation Committees are summoned at a time for a training camp. The members are divided into several groups for purposes of discussions. The subjects dealt with are the Paddy Lands Act, the powers and duties of Cultivation Committees, construction and maintenance of minor irrigation, crop insurance, rural credit, the guaranteed price scheme, and agricultural extension. This training programme is managed by the Paddy Lands Branch of the Department of Agrarian Services and the lectures at these training camps are given by officers of the Department of Agrarian Services as well as by officers of related Departments. The Co-operative Department also runs short courses for training farmers in the management and operation of Multi-purpose Co-operative Societies.

11. The following is a resume of the programmes of training now available to public officers working in the agricultural sector:

The Department of Agriculture runs an "In-service Training Institute": at Peradeniya which provides a two-week course of training for new recruits to the Department in the grades of Agricultural Instructor and Krushi Karma Viapthi Sevaka. The Institute also provides a two-week course of "In-service" training for Agricultural Instructors and Krushi Karma Viapthi Sevakas with the emphasis on specific subjects and extension methods to be adopted in the different areas of the Island.

The Department of Agrarian Services has as yet no regular scheme of training for Departmental Officers except in the grade of Village Cultivation Officers who are given occasional technical training organised by the Minor Irrigation Branch of the Department. Courses are also run for Co-operative Inspectors at the School of Co-operation, Polgolla on specific aspects of the Co-operative Movement especially on the rules and regulations governing the establishment, supervision and auditing of Co-operative Societies.

12. The implementation of the Agricultural Development Proposals 1966—1970 has created a new situation in that large numbers of officers recruited to the Administrative Service have been called upon to shoulder responsibilities for implementing in association with technical officers, an agricultural development programme. The participation of such a large number of general administrators in an agricultural

development programme which is being intensively implemented is a situation without precedent in Ceylon. The officers principally involved are those of the Ceylon Administrative Service in different grades with different periods of service and in fact with different levels of experience. The Ceylon Administrative Service and the former Civil Service had provided for very little by way of formal training for these officers. Recently, with the establishment of the Academy of Administrative Studies, there is an institution for providing training courses for personnel in the public sector. This institution should be required to shoulder a major part of the burden of providing special courses to officers of the Ceylon Administrative Service with a view to orienting them for agriculture and rural development work in the District Administration. The content of the courses will have to be fashioned in consultation with the Ministries of Agriculture and Lands and the Agrarian Research and Training Institute.

13. A fundamental consideration in a training programme intended to cover a large development sector of the country is that the training given to different groups at different levels and through different institutions should inter-lock at a common base, upon which the farmers as well as government personnel can work towards the objectives set out in the plan. An institutional framework excellent in potential has emerged in the special extension projects, both small and large, that are being developed in all parts of the Island. The varied experiences of Special Projects is proving the correctness of the initial anticipation that it is not merely a method of extension but also a community operation where the farmers along with a team of officers work under the super-ordinate authority of a production programme and a calendar of operations. A place of importance must be accorded to the institution of Special Projects in agricultural extension, education and training during the period of the present plan.

14. The proposals for agriculture education and training which are presented below have been prepared to meet the objectives of the plan as set out in Chapter I.

15. Farmer education and training during the period of this plan should be undertaken for the following purposes:—

(*a*) To enable a farmer who is engaged in growing a particular crop *e.g.*, paddy, chilli, onions, or maize, to improve his techniques of management so that he obtains a higher yield. Similarly, a farmer engaged in livestock should have opportunities of learning better management practices for reducing costs and increasing income.

(*b*) To enable a farmer who grows a particular crop to learn the advantages and techniques of management of growing a variety of crops where possible in association with livestock on his holding. This involves teaching and convincing the farmer of the economic advantages of diversified agriculture. Diversification cannot be taught without an education in the criteria of selection of the crops and animals most suitable for his holding.

(*c*) To enable a farmer who is engaged in diversified farming to learn the advantages of correct mechanisation, soil and water management and in fact of all the planning and organization that is required of a farm holding that is operated on commercial lines.

(*d*) To enable farmers referred to in categories (*a*), (*b*) and (*c*) above to build and manage institutions such as Cultivation Committees and Co-operative Societies for purposes of obtaining agricultural supplies and marketing the produce of their farms.

(*e*) The responsibility of Government in the area of community development falls on a large number of Departments and Corporations serving the rural sector. The Co-operative Department, the Department of Rural Development and Cottage Industries as well as the Departments of Health and Education would carry high responsibilities in this field of work. At the same time community development in rural Ceylon has to move outwards from an agricultural base which is the means of production of most rural communities. Production cannot proceed in isolation and community development must come alongside the development of the agricultural economy. These considerations require that community development for larger social goals is a complex effort falling on many government agencies and even non-governmental organisations. Nevertheless in the immediate future the involvement with agricultural production itself is likely to be the major concern. The Departments of Government dealing with direct agricultural productivity will have to take the initiative in bringing other Government agencies into specific programmes of community development as they may appear in different areas of the Island.

16. Farmer training programmes related to the purposes stated at (*a*), (*b*) and (*c*) above should be organised by the Department of Agriculture. The first purpose is best served by organising short courses of one to two-days' duration in the areas in which the particular crops or livestock are important. This can be done in two ways. One by short courses given in the field in any available location. The other by courses organised in a location central to a given area where the participating farmers can attend the course without much inconvenience. In this respect the buildings and facilities in the Practical Farm Schools should be fully utilised. These short courses which are referred to as 'Unit Courses' seek to train a person in a branch of agriculture in which the person concerned is desirous of receiving training. For instance in an area specializing in vegetable cultivation, in poultry or in piggery short on-location training courses should be organised. Such courses will naturally have a strong practical and commercial bias. Arrangements for these short courses where appropriate could also include the facilities available with private agriculturists and agricultural enterprises.

17. The courses designed to serve the purposes set out at (*b*) and (*c*) above should be courses of longer duration. These courses can also be organised in the Practical Farm Schools. Where such facilities are not available suitable locations should be found in close proximity to the areas in which the farmers to be benefited by the course are resident. In addition to courses of this nature selected farmers who can benefit from courses dealing with higher management techniques in farming should be sent for training at the Regional Training Centres which are proposed elsewhere.

18. A Farmer Training and Extension Centre should be established in each District. These centres could be located at existing Practical Farm Schools and at the proposed Regional Training Centre. In Districts where such facilities do not exist new centres should be established. Detailed proposals are made later in this section.

19. The purposes of (*d*) and (*e*) above must be dealt with in a concrete and practical way which will guide farmers as well as officers of Co-operative Societies and Cultivation Committees and Government Services in improving the functioning of these organisations. Since there are only very few Agricultural Economists and other social scientists in Ceylon at present who are experienced in these fields, the initial efforts towards the attainment of the purposes of (*d*) and (*e*) should be organised within the framework of Special Projects.

STAFF TRAINING

20. In surveying the facilities now available for training Public Servants working in the agriculture sector one is forcibly struck by the following matters:—

1. The number and variety of training programmes that are run by different Departments directly related to the agriculture sector. Some of the prominent examples are the Department of Agriculture, Department of Co-operatives and the Department of Agrarian Services. In addition the Department of Rural Development, the Department of Irrigation and the Forest Department also run staff training courses.

2. The extent of the facilities and expenditure incurred in running and maintaining these programmes.

3. The lack of relatedness and the compartmentalised manner in which each authority has organised the objectives and scope of their respective training programmes.

4. The almost complete absence of a pooling of resources and objectives which are larger than immediate departmental objectives but nevertheless central to the purposes of agricultural development.

21. While each department or speciality must necessarily organise their respective programmes of training, it is a waste of the resources available in the agricultural sector to maintain these programmes in restricted departmental isolation. There must be a regular movement of personnel both in teaching and learning between these various institutions. They can often pool resources or lend each other facilities. Most important of all they can set up special courses of field and classroom study which enables the knowledge of several specialities to be brought together for the purpose of training programmes. Universities in other countries have set up courses in such things as project planning and the administration of natural resources. These are programmes combining a variety of disciplines and specially set up for those engaged in development programmes irrespective of their basic training. It is time that agricultural planning in Ceylon faced basic questions of this nature with a view to the establishment of a new framework for the training of Government personnel in the agriculture sector. The traditional view of each department conducting some training for its own staff (while being important in itself) should be superseded by a framework in which the departmental training programmes are pooled, mixed and harmonised for the benefit of agricultural development work as a whole. On the basis of these proposals, there is a need for a small organisation to act as a clearing house and liaison officer for all training programmes having a bearing on the agricultural sector. The duplication of training institutions merely because there is a need for them in particular areas of the economy is not desirable. As far as possible the demands for new institutions should be met by enlarging or modifying the existing ones. An institution ideally suited for co-ordinating the different local training programmes in the Agriculture sector is available in the Agrarian Research and Training Institute. The co-ordination of existing training programmes and the organisation of new ones to meet the expanding demands of the agriculture sector is in fact one of the specific responsibilities of this Institute.

22. Nevertheless, reference has already been made to the need for annual refresher courses for extension staff to sustain their interest and to keep them up-to-date with the technical developments in branches of agriculture in which they are working. The need for providing an agriculture training for administrators and field staff of other departments in the agricultural sector has also been stressed. The numbers that will have to regularly pass through such training courses are relatively large and permanent arrangements will have to be made if the programme is to be sustained at an effective level.

23. There is at present only one training centre — the In-service Training Institute at Peradeniya — to cater for these requirements and which can deal with not more than about 400 trainees a year. Furthermore, since it is located in the low-country mid-lands adequate arrangements cannot always be made to provide the specific kinds of training that will be required by Government personnel, especially the extension staff, working in the other agro-climatic regions of the country. As in the case of research the best arrangement would be to decentralize in-service training on a regional basis. A proposal was made earlier in this Chapter that the new

'Extension Subject Matter Specialists' should be located at the main Regional Research Stations. If the proposed Regional Training Centres are also located at these points a situation would arise in which Research, Extension and Training would become centralized at one point within each region, at what could be called an 'Agricultural Centre'. Such a centre which could also be used for specialised farmer training, has obvious advantages and could provide the organisational base for staff and farmer training.

The following regional training centres are proposed:—

(*i*) *Wet zone*	—	mid-lands — In-service Training Institute, Peradeniya — already operational;
(*ii*) *Dry zone*	—	R B E — Northern region — Maha-Illuppallama to be established in 1970 with aid from the Ford Foundation;
(*iii*) *Dry zone*	—	R B E — Southern region — Angunakolapelessa, Uda-Walawe, to be established in 1971 — with aid from the Asian Development Bank;
(*iv*) *Intermediate zone*	—	Semi-dry up-lands region — Badulla District at new regional research station;
(*v*) *Wet zone*	—	low-lands region — Ambepussa
(*vi*) *Dry zone*	—	Latosol region — Vanathavillu

Foreign Training

24. Foreign training plays a very important role in increasing technical competence and in providing incentives to personnel working in research, extension, education and training. This is especially so in the case of post graduate training. Two basic conditions have however to be satisfied if foreign training is to be fully effective. Firstly, the courses must be very carefully selected in relation to the work each candidate is doing and will be called upon to do on his return from training. Secondly, the institution in which training courses are being given must be reasonably closely related to the climatic and social conditions of Ceylon. While there are training courses where the latter condition does not apply as a general rule it would be necessary to give preference to courses being conducted in the Asian region for example, in India, Pakistan, the Philippines, Malaya and Taiwan.

25. Mention has to be made here of the question of post graduate training of Research Officers. The principle of providing all Research Officers with an opportunity of doing post graduate training is an essential one. Wherever possible this should be done locally or within the Asian region as for example, in India and the Philippines. It is only in exceptional circumstances where the required training

cannot be provided within the region that officers should be sent to Western Countries.

26. The facilities for post graduate research at the Faculty of Agriculture should be expanded during the period of this plan. In most countries the data gathered by post graduate research workers during the course of their theses is a very important source of scientific data on agriculture and an important addition to the body of scientific data accumulating within the country. Until such time as the post graduate facilities are fully built-up the University of Ceylon should explore the possibility of making specific arrangements with Universities abroad for granting Ph.D. Degrees locally in association with them. The candidates could do their course work abroad at the foreign University and their research work for the thesis in Ceylon. Such an arrangement is already operating in several Universities in India, Africa and the Philippines.

Agricultural Education

27. As mentioned in the opening sections of this Chapter, the subject of agriculture education embraces a large complex which even in its institutionalised forms must include the Secondary Schools, the Junior Universities, the University, the Practical Farm Schools and the School of Agriculture. For reasons which were explained earlier it has been found necessary to restrict the scope of the present discussion and the proposals based on them to the area of agriculture education supervised by the Department of Agriculture. Proposals are also made here for the level of educational attainment that should be acquired by candidates seeking employment under Government.

The Practical Farm Schools

28. The Practical Farm Schools were established from 1942 onwards for the purpose of giving a training in practical agriculture to young men and women who would be engaged in agriculture after leaving school on their own lands or on lands given to them by the Government. By 1958 there were 19 such schools, (15 Boys' Schools and 4 Girls' Schools). The objectives for which these schools were established were not realised. Most students entering the Practical Farm Schools had no lands of their own suitable for development on commercial lines. When the parents of the students had any land they were mostly fragmented village holdings which were handed down to all the children in customary fashion after the death of the parents. The requirement that a student entering a Practical Farm School should produce proof of having land on which he could engage in farming after the period of training became an ineffective formality which was overcome by producing a certificate from the D.R.O. or V.H. (Grama Sevaka) to the effect that the parents of the applicant student had some land. In any event the expectation that students leaving the Practical Farm Schools could take to an agriculture career on their own was utopian. The income to be obtained from domestic agriculture was meagre when compared with incomes available in government employment or business. Even more im-

portant than income was the weight of social prestige attached to government employment. The students passing out from the Practical Farm Schools therefore became applicants for government employment, particularly under the Department of Agriculture. Since the numbers that could be employed by government were far less than those coming out from the schools, large numbers of students with the Practical Farm School Certificate became disgruntled job seekers. The investment made on their training was generally a waste of resources.

29. The Practical Farm Schools have suffered from another fundamental defect. The one-year course of training provided in these schools was in fact of such a limited scope that it was an inadequate preparation for a young man to take to practical agriculture in the future. The course of training was also not one of sufficient depth which would have enabled the students to adequately fit into an agriculture job in the government sector.

30. It was in this context that it was decided in 1965 to utilize 14 Practical Farm Schools for the purpose of giving teachers from Secondary Schools in the Department of Education a 6 months' training in agriculture. The Practical Farm Schools continued to be staffed and run by the Department of Agriculture. The Department of Education is now organising its own teacher training programmes in agriculture but it is expected that the Practical Farm Schools will be gradually released from the responsibility of training teachers. In fact, 5 of the 14 Schools will cease to train teachers this year.

31. It is proposed that the 5 Practical Farm Schools now run by the Department be maintained to provide a general training in agriculture, with emphasis on the practical aspects to men and women who desire to practice farming on their own or who wish to seek employment in public and private sectors at the junior technical level. The present output from the schools is 250 students per year. The need for increasing output of students from schools and for opening additional Practical Farm Schools should be examined in relation to availability of job opportunities for persons with this level of training. The minimum educational qualification for admission should be the G.C.E. (O) Level with passes in specified subjects. The duration of the course should be a period of two years. The content of the academic and practical training needs evaluation. In this connection some useful suggestions have been made by Mr. Martens of the F.A.O. in the report on the F.A.O.—Ceylon Agricultural Extension Workshop held in September 1969. Qualitative improvement in the content of the education imparted in these schools will entail improvements in the numbers and quality of the teaching staff.

32. In order to get a better return on the investment in training and to ensure that high farming standards obtain in the new Settlement Schemes, Youth Settlement Projects and in the Mahaweli and Uda-Walawe Projects, it would be necessary to make more positive arrangements than exist at present for settling students from the Practical Farm Schools on these new Projects. In fact in the case of Youth Schemes all the youth who are being chosen for settlement could be put through the Practical Farm Schools before they are settled on the land.

33. The Practical Farm Schools which are likely to be released by the Department of Education should be used entirely as centres for farmer training and for the provision of 'unit' courses referred to earlier. Such courses should in fact be provided at all the Practical Farm Schools as well.

34. The Department of Agriculture has for some time recognised the need to up-grade the level of basic training of the present Krushi Karma Viapthi Sevakas and has provided scholarships for up to 30 K.V.SS a year to enter the School of Agriculture, Kundasale to complete the two-year course of training provided there. It is proposed that this policy be followed more intensively so that every deserving K.V.S. has an opportunity of completing the higher course of training that will be provided at the 2-year certificate course at the proposed new Practical Farm Schools.

The School of Agriculture

35. The School of Agriculture at Kundasale admits students with the minimum educational qualification of the G.C.E. (O) Level with passes in specified subjects for a two-year course leading to a certificate. In the same way that the level of technical competence expected of the village level extension worker is proposed for up-grading to meet the demands of a village level programme, it is necessary to effect a suitable up-grading of the students passing out from the Agriculture School and to provide them with a sound training in the science and practice of Agriculture and Home Economics. Where the product of the Practical Farm Schools as now proposed is expected to function as a Junior Technician, the product from the Agriculture School should be able to function as a Technician. This objective can be achieved only by taking steps to enhance the level of education and training given to candidates passing out from the School of Agriculture. It is therefore proposed that the minimum educational attainment for admission to the School of Agriculture be raised to the G.C.E. (A) Level with passes in specified subjects, while the duration of the course is maintained at the prevailing period of two years. The content of the academic and practical training will have to be evaluated and in this instance too useful suggestions have been made in the Marten's report referred to earlier. Here again a qualitative improvement in the content of the education imparted at this school will entail improvements in the quality and numbers of the teaching staff.

36. The present output of the School of Agriculture is 150 students per year. Any increase in this number must be determined only after a careful examination of the employment opportunities that will arise in the coming years. Attention must be drawn to the need to provide a number of scholarships annually to promising Agricultural Instructors employed by the Department of Agriculture to enter the School of Agriculture. In conclusion, it should be noted that the Junior Universities will be training students in vocations including that of Agriculture for a period of two years after they are admitted with the minimum educational qualification of the G.C.E. (A) Level.

LIST OF RESEARCH AND EXPERIMENT STATIONS IN THE DEPARTMENT OF AGRICULTURE

1. Central Agricultural Research Institute, Gannoruwa, Peradeniya,
   Wet Zone, Mid-lands region.
2. Agricultural Research Station, Maha-Illuppallama,
   Low-country dry zone, Northern region.
3. Agricultural Research Station, Suriyawewa,
   Low-country dry zone, Southern region.
4. Agricultural Research Station, Sita Eliya,
   Wet zone, Up-lands region.
5. Agricultural Research Station, Rahangala,
   Intermediate zone, Up-lands region.
6. Central Rice Breeding Station, Batalagoda,
   Intermediate zone, Low-lands region.
7. Rice Experiment Station, Ambalantota,
   Low-country dry zone, Southern region.
8. Rice Experiment Station, Kilinochchi,
   Low-country dry zone, Northern region.
9. Rice Experiment Station, Karadiyan-aru,
   Low-country dry zone, Eastern region.
10. Rice Experiment Station, Nalanda,
    Intermediate zone, Low-land region.
11. Rice Experiment Station, Bombuwela,
    Wet zone, Low-country dry zone.
12. Rice Experiment Station, Karapincha,
    Wet zone, Low-country dry zone.
13. Rice Experiment Station, Labuduwa,
    Wet zone, Low-country dry zone.
14. Other Field Crops Experiment Station, Tinnevelly,
    Low-country dry zone, North-western Coastal region—
    (Latosols)
15. Fruit Experiment Station, Yakkala,
    Wet zone, Low-country region.

RESEARCH STAFF OF DEPARTMENT, LOCATION AT DIFFERENT STATIONS IN TERMS OF FUNCTIONS AND IN RELATION TO AGRO-CLIMATIC REGIONS

Zone	Dry Zone											
Region	North			South						East		
Soil types:—	(Reddish brown earths)									Non-colic iron		
Stations:	Maha-Illuppal-lama			Suriya-wewa			Ambalan-tota			Kara-diyan Aru		
Staff Grades	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI
1. Field Crops												
(*a*) Rice												
Breeding	2	—	1	—	—	—	1	—	—	—	—	—
Agronomy	2	3	2	1*	—	—	—	2*	1	—	1	—
Soil and Fertilizer ..	1	—	—	—	—	—	—	—	—	—	—	—
Water Management ..	1*	—	—	—	—	—	—	—	—	—	—	—
Pathology	1*	—	—	—	—	—	—	—	—	—	—	—
Entomology	1*	—	—	—	—	—	—	—	—	—	—	—
Weed Control	—	—	—	—	—	—	—	—	—	—	—	—
Total ..	8	3	3	1	—	—	1	2	1	—	1	—
(*b*) **Other Field Crops:**												
Cereals	1	2	—	—	—	—	—	—	—	—	—	—
Pulses	1	—	—	—	—	—	—	—	—	—	—	—
Chillies and Onions ..	1	—	—	—	—	—	—	—	—	—	—	—
Fibre Crops	—	—	1	—	—	—	—	—	—	—	—	—
Water Management ..	2	—	—	—	—	—	—	—	—	—	—	—
Agronomy	—	1	2	—	2	1	—	—	—	—	—	—
Soil and Fertilizer ..	1	—	—	—	—	—	—	—	—	—	—	—
Entomology	—	—	—	—	1	—	—	—	—	—	—	—
Pathology	—	—	—	—	—	—	—	—	—	—	—	—
Weed Control	1*	—	—	—	—	—	—	—	—	—	—	—
Total ..	7	3	3	—	3	1	—	—	—	—	—	—
2. Vegetables and Potatoes	1	—	—	—	—	—	—	—	—	—	—	—
3. Fruits	1	1	1	—	—	—	—	—	—	—	—	—
4. Economic Perennial Crops	—	—	—	—	—	—	—	—	—	—	—	—
5. Tobacco	—	—	—	—	—	—	—	—	—	—	—	—
6. Pastures	2	—	—	—	—	—	—	—	—	—	—	—
7. Cereal Chemistry ..	—	—	—	—	—	—	—	—	—	—	—	—
8. Food Technology ..	—	—	—	—	—	—	—	—	—	—	—	—
9. Soil Conservation ..	—	—	—	—	—	—	—	—	—	—	—	—
10. Plant Introduction ..	—	—	—	—	—	—	—	—	—	—	—	—
11. Systematic Botany ..	—	—	—	—	—	—	—	—	—	—	—	—
12. Field Trials Unit ..	—	—	—	—	—	—	—	—	—	—	—	—
13. Projects and Programmes..	—	—	—	—	—	—	—	—	—	—	—	—
Total ..	4	1	1	—	—	—	—	—	—	—	—	—
Grand Total ..	19	7	7	1	3	1	1	2	1	—	1	—

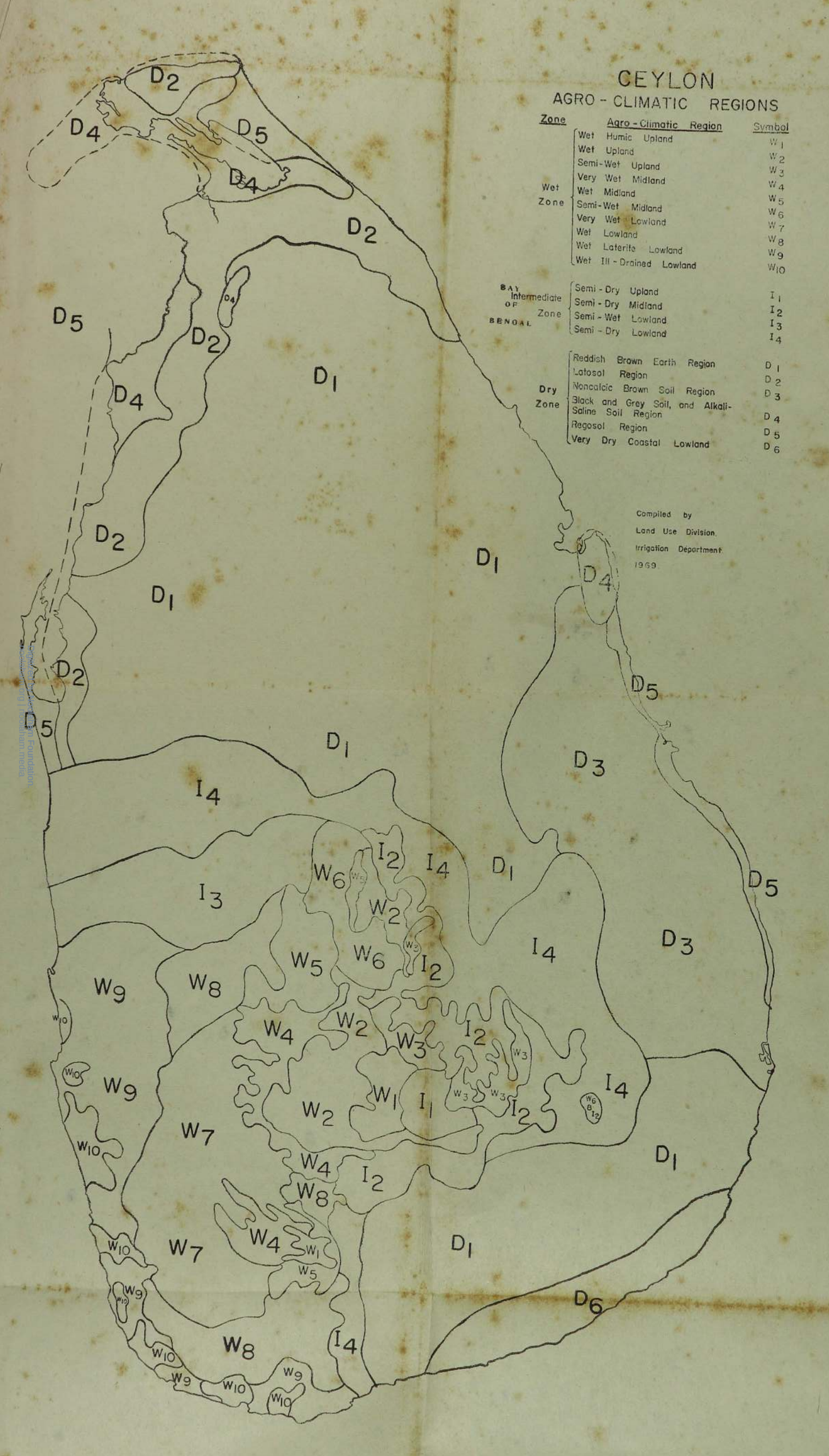
Zone	Intermediate Zone								
Region	North-west coastal			Up-lands			Low-lands		
Soil types:—	(Latosols)								
Stations:	Tinne-velly Paranthan			Rahangala			Batalagoda		
Staff Grades	RO	EO	AI	RO	EO	AI	RO	EO	AI
1. Field Crops									
(*a*) Rice									
Breeding	—	—	—	—	—	—	4	—	2
Agronomy	—	—	—	—	—	—	—	1	—
Soil and Fertilizer ..	—	—	—	—	—	—	—	—	—
Water Management ..	—	—	—	—	—	—	—	—	—
Pathology	—	—	—	—	—	—	—	—	—
Entomology	—	—	—	—	—	—	—	1	—
Weed Control	—	—	—	—	—	—	—	—	—
Total ..	—	—	—	—	—	—	4	2	2
(*b*) **Other Field Crops:**									
Cereals	—	—	—	—	—	—	—	—	—
Pulses	—	—	—	—	—	—	—	—	—
Chillies and Onions ..	—	—	1	—	—	—	—	—	—
Fibre Crops	—	—	—	—	—	—	—	—	—
Water Management ..	—	—	—	—	—	—	—	—	—
Agronomy	—	1	—	—	—	—	—	—	—
Soil and Fertilizer ..	—	—	—	—	—	—	—	—	—
Entomology	—	—	—	—	—	—	—	—	—
Pathology	—	—	—	—	—	—	—	—	—
Weed Control	—	—	—	—	—	—	—	—	—
Total ..	—	1	1	—	—	—	—	—	—
2. Vegetables and Potatoes	—	—	—	1	—	—	—	—	—
3. Fruits	—	—	—	—	—	1	—	—	—
4. Economic Perennial Crops	—	—	—	—	—	—	—	—	—
5. Tobacco	—	—	—	—	—	—	—	—	—
6. Pastures	—	—	—	—	—	—	—	—	—
7. Cereal Chemistry ..	—	—	—	—	—	—	—	—	—
8. Food Technology ..	—	—	—	—	—	—	—	—	—
9. Soil Conservation ..	—	—	—	—	—	—	—	—	—
10. Plant Introduction ..	—	—	—	—	—	—	—	—	—
11. Systematic Botany ..	—	—	—	—	—	—	—	—	—
12. Field Trials Unit ..	—	—	—	—	—	—	—	—	—
13. Projects and Programmes..	—	—	—	—	—	—	—	—	—
Total ..	—	—	—	1	—	1	—	—	—
Grand Total ..	—	1	1	1	—	1	4	2	2

Zone	Wet Zone																										
Region	Up-lands						Mid-lands						Low-lands														
Stations:	Nalanda			Sita-Eliya			CARI Ganno-ruwa			Karapincha			Bombuwela			Labuduwa			Walpita			Yakkala			TOTAL		
Staff Grades	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI	RO	EO	AI
1. Field Crops																											
(*a*) Rice																											
Breeding	—	—	—	—	—	—	1	—	—	—	1	—	—	—	1	—	1	—	—	—	—	—	—	—	8	2	4
Agronomy	—	—	2	—	—	—	5	2	6	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	9	9	12
Soil and Fertilizer ..	—	—	—	—	—	—	5	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	2	—
Water Management ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Pathology	—	—	—	—	—	—	3	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	1
Entomology	—	—	—	—	—	—	3	2	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4	4	1
Weed Control	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total ..	—	—	2	—	—	—	17	9	8	—	1	1	1	1	1	—	1	—	—	—	—	—	—	—	32	20	18
(*b*) **Other Field Crops:**																											
Cereals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	—
Pulses	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Chillies and Onions ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Fibre Crops	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Water Management ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
Agronomy	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3
Soil and Fertilizer ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Entomology	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
Pathology	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
Weed Control	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Total ..	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	7	5
2. Vegetables and Potatoes	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
3. Fruits	—	—	—	—	—	1	2	1	1	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	3	3	5
4. Economic Perennial Crops	—	—	—	—	—	—	1	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	3
5. Tobacco	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
6. Pastures	—	—	—	3	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	2	2
7. Cereal Chemistry ..	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
8. Food Technology ..	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
9. Soil Conservation ..	—	—	—	—	—	—	3	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	6
10. Plant Introduction ..	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
11. Systematic Botany ..	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
12. Field Trials Unit ..	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	13
13. Projects and Programmes..	—	—	—	—	—	—	—	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2
Total ..	—	—	—	4	2	3	11	5	13	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	20	9	32
Grand Total ..	—	—	2	4	2	3	31	14	21	—	1	1	1	1	1	—	1	—	—	—	1	—	1	—	62	36	55

* works with other crops as well R.O. = Research Officer E. O. = Experimental Officer A. I. = Agricultural Instructor

ANTICIPATED ADDITIONAL TECHNICAL STAFF REQUIRED TO IMPLEMENT PROPOSALS FOR RESEARCH EXTENSION AND EDUCATION

	Present staff	*Additional staff required*
1. Research		
Research Officers	62	83
Experimental Officers	37	102
Laboratory Assistants	59	186
Librarians	1	2
Assistant Librarian	2	—
Technicians	—	3
Statistical Assistants	3	6
Research Station Superintendents ...	1	7
2. Extension (including Mahaweli and Walawe Projects)		
Agricultural Officer Grade:		
(*i*) District Agricultural Extension Officers ...	22	22
(*ii*) Subject matters Specialists	—	56
(*iii*) Extension Supervisors (Project Managers)	7	73
(*iv*) Crop Production and other specialised posts	8	54
Agricultural Instructors	319	500
Extension Workers (K.V.SS.) ...	1493	212 +
(+ 1970/71 *only for Mahaweli and other projects*)		
3. Education and Training		
(*a*) **In-service and Farmer Training Centres**		
Agricultural Officers	1	29
Agricultural Instructors	5	23
(*b*) **Education (Schools of Agriculture and Practical Farm Schools)**		
Principals — (*i*) Graduate ...	1	5
(*ii*) Non-Graduate	4	—
Lecturers — (*i*) Graduates ...	17	42
(*ii*) Non-Graduates	17	—
Demonstrators	6	45
Laboratory Assistants	3	7
Physical Training Instructors	2	1
Librarian	—	1


CEYLON
AGRO - CLIMATIC REGIONS
Zone
Agro - Climatic Region
Symbol
Wet Zone
Wet Humic Upland W1
Wet Upland W2
Semi-Wet Upland W3
Very Wet Midland W4
Wet Midland W5
Semi-Wet Midland W6
Very Wet Lowland W7
Wet Lowland W8
Wet Laterite Lowland W9
Wet Ill - Drained Lowland W10
BAY OF BENGAL
Intermediate Zone
Semi - Dry Upland I1
Semi - Dry Midland I2
Semi - Wet Lowland I3
Semi - Dry Lowland I4
Dry Zone
Reddish Brown Earth Region D1
Latosol Region D2
Noncalcic Brown Soil Region D3
Black and Grey Soil, and Alkali-Saline Soil Region D4
Regosol Region D5
Very Dry Coastal Lowland D6
Compiled by
Land Use Division.
Irrigation Department
1969