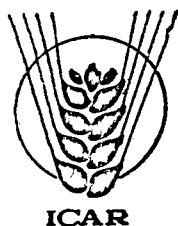


R E P O R T
OF THE WORKING GROUP
FOR THE FORMULATION OF
FOURTH FIVE YEAR PLAN PROPOSALS
ON
H O R T I C U L T U R E



Published by
INCIL OF AGRICULTURAL RESEARCH
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PREFACE

PREPARATORY work for the formulation of Horticultural Development under the Fourth Five Year Plan was taken up in the Ministry of Food & Agriculture in June, 1963 at the instance of the Planning Commission. Following the lines adopted in connection with the preparation of Third Five Year Plan, a Working Group on Horticulture was set up in the Department of Agriculture on the following terms of reference :—

- (1) To make a critical review of the progress of the programmes and schemes in the Third Five Year Plan period;
- (2) To assess, in the light of current trends and other available data, the position likely to be reached at the end of the Third Plan period ; and
- (3) To formulate proposals for the Fourth Five Year Plan in the perspective, wherever possible, of development over a 10-year period.

On the basis of the material that is available in the Department of Agriculture and the results of studies, if any, already made, the Working Group has attempted to make an assessment of the requirements, the potentialities for development and the organisational and technical considerations involved therein and has given broad indication of the physical programmes proposed and the financial outlays needed. The Report was transmitted to the Planning Commission on November 12, 1963.

The proposals and recommendations made in this Report have been taken into account in the consolidated Memorandum 'Approach to Agricultural Development in the Fourth Five Year Plan' submitted by the Ministry of Food & Agriculture to the Planning Commission.

G.S. RANDHAWA
*Chairman of the Working
Group on Horticulture*

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SUMMARY

HORTICULTURE covers a wide range of subjects such as fruit-growing, vegetable cultivation, floriculture and rearing of beverage, medicinal and insecticidal crops.

Its role in providing food to the people is significant. These are protective foods being rich in several vitamins and minerals. Some fruit crops give enormous yields and have a high calorific standard. By a liberal intake of fruits and vegetables, economy in cereal consumption is possible.

The crops are also highly remunerative. They play an important role in commerce. Many countries earn sizeable foreign exchange through export of these crops. In our own country, horticultural crops such as coffee, tea, rubber and cashewnut help us significantly.

In brief, horticulture supplies better food, provides for diversified and aesthetic living, enhances land value and creates better purchasing power for those engaged in the industry.

HORTICULTURAL DEVELOPMENT PRIOR TO FOURTH FIVE YEAR PLAN PERIOD

Horticultural development in the pre-Plan period was mainly through some ad hoc schemes on commercial fruits. There was no change in position during the First Five Year Plan but in the Second Five Year Plan, a scheme for development of fruit production was operated and 2.88 lakh acres were newly planted and 1.9 lakh acres were subjected to renovation measures. As many as 5,046 persons were trained as gardeners. In the Third Five Year Plan, besides the development scheme, establishment of progeny orchards was taken up. Nine Horticultural Societies were given grants-in-aid. A scheme for vegetable production was launched.

✓ A problem needing urgent attention was to meet the demand for fruits and vegetables from cities and towns. Besides kitchen gardens, emphasis needs to be placed on selected varieties of fruits and vegetables and 'truck' gardening. So far only problems of local importance have been tackled. Certain serious diseases of fruits and vegetables require urgent attention. Incentives such as credit, and an Orchard Development Corporation to set up garden colonies, are required. An important problem is to avoid wastage in collection and marketing.

SCHEMES FORMULATED FOR THE FOURTH FIVE YEAR PLAN

With the objectives outlined above, an overall provision of Rs. 5,032.40 lakhs (Rs. 4,027.02 lakhs as medium and long-term loans) for operating 14 individual schemes on Fruit Production, Vegetable Production, Progeny Orchards, Plant Introduction, Certification, Cocoa, etc., have been proposed.

CHAPTER I

INTRODUCTION

HORTICULTURE covers, among others, a wide range of subjects such as fruit-growing, vegetable cultivation, floriculture and rearing of medicinal, beverage and insecticidal crops. It constitutes, thus, a service which is no less important to the well-being and happiness of mankind than any other avocation.

Horticulture in Human Nutrition

Its role in providing food to the people is almost as significant as that of agriculture itself. Fruits and vegetables are ranked as protective foods, being rich in several vitamins such as C, B-complex and A. They form ready sources of mineral salts, the lack of which causes metabolic disturbances. As a source of food supply from land, fruits can vie with cereals. The maximum yield from paddy for instance recorded even under crop competitions is only about 13,000 kgs. per hectare while the comparable figures for fruits range anything from 22,000 kgs. (bananas), 45,000 kgs. (pineapples) to 90,000 kgs. (grapes) per hectare. In the present general shortage of food in the country, scarcity of land available for being brought newly under the plough and high density of population, fruit and vegetable crops with high yield potentials deserve preferential consideration.

For judging the value of food commodities, the calorific standard is generally adopted as the most acceptable and even on this basis fruits are in the vanguard. It is estimated that an adult normally requires on an average about 11,00,000 calories per year through the food he consumes. This can be secured from roughly 0.44 hectare of wheat which on an equivalent basis works out to 0.03 hectare of banana, or 0.16 hectare of mango. In other words, banana produces about 15 times the food energy produced by wheat, and mango similarly produces about $2\frac{1}{2}$ times as much food energy as wheat per unit area. It is not suggested thereby that fruits can wholly replace staple foods such as rice, wheat or millets, but they can go a long way in reducing the pressure on the shortfalls in the supply of the foodgrains. Further, by a liberal use of fruits and vegetables, economy in overall consumption of food can be brought about. In Japan, nutrition experts found that as against a normal intake of 3,200 calories per adult per day, it was possible to maintain

an adult in sound health by giving him food of the equivalent of 1,600 calories provided it is amplified by protective foods like fruits and vegetables. In other words, the intake of the latter can be encouraged for reducing appreciably the consumption of energy-giving cereals. Germany not only tried this method but also proved its effectiveness during the last war.

Horticulture in Farm Economics

The remunerative aspects of horticulture are no less important than those related to food supply. It is estimated for instance that the area occupied by fruits in this country is only 1.0 per cent of the total cultivated area. The net income from this area is computed at Rs. 150 crores. As against this, the estimated income from all other crops is placed at Rs. 3,241 crores. In other words, fruits represent 4.9 per cent of the total annual crop wealth although they cover only 1.0 per cent of the cropped area. Since horticultural crops are high-priced and labour-intensive, they have a special significance in the agricultural economy of India as in the case of Netherlands. Fruits are a main source of national wealth in several countries, outstanding examples of which are California and Florida in U.S.A., Spain, Italy, Israel, South Africa and Australia.

The income from individual well-kept orchards is so high that it can prove a most attractive proposition for educated young persons who are on the look out for a remunerative landed avocation. Annual incomes exceeding Rs. 25,000 per hectare are not unknown from orchards of apples, grapes and sweet oranges. There are many instances of individual mango trees and grape vines which have yielded fruits worth over Rs. 200 a year.

Horticulture in Commerce and Industry

The importance horticulture plays in commerce can be exemplified by the export trade of several countries. In U.S.A., fruits form the leading export produce though occupying only one-fourth of the total cultivated area. Equally large acquisitions to national wealth have accrued to other countries such as Spain, Brazil, Israel and South Africa from fruits alone. In our own country, horticultural crops contribute a great deal to our export earnings. Coffee, tea, rubber, cashewnut, pepper and cardamom earn foreign exchange on a scale which helps to balance the national economy in no small measure. Our present plans are being aimed at achieving an ultimate annual target of Rs. 100 crores as export earnings from fruits.

It will not be out of place here to mention that horticulture also promotes the pace of industrialisation. It is the mother to so many industries such as canning, manufacture of essential oils, perfumes, beverages, horticultural equipment, machinery, etc.

Lastly, it must be stressed that we can neglect horticulture only to our peril. The ever-increasing pace of urbanisation and walling up of large sections of the populations in the cities, which keep on growing all the time, will demand the provision of some means to lessen physical congestion, create centres of recreation and retreats for aesthetic rehabilitation. Parks and gardens are the lungs of urban areas. Cultivation of flowers brings about intimacy with nature and as a hobby, therefore, it is unsurpassed. The profession of horticulture is an all the year round occupation and is a continuous challenge to the wit of man, particularly in such situations as hill slopes or low rainfall areas where permanent assets can ultimately be created by perseverance and planning for horticultural development.

In brief, therefore, horticulture supplies better food, provides for diversified and aesthetic living, develops natural resources and yields higher returns per unit area. It also enhances land values and creates better purchasing power for those who are engaged in this industry.

CHAPTER II

HORTICULTURAL DEVELOPMENT PRIOR TO FOURTH FIVE YEAR PLAN PERIOD

Pre-Plan Period

In the pre-Plan period, whatever encouragement was given to horticulture was through *ad hoc* schemes for improvement through research on some of the fruits of major commercial importance like mango, citrus and banana, and important vegetables operated in a few States with financial assistance from the Indian Council of Agricultural Research.

First Five Year Plan

This position was maintained, more or less, without change in the First Five Year Plan period, owing to the over-riding need for increasing production of cereals to meet the serious food shortages facing the country then.

Second Five Year Plan

In the Second Five Year Plan period, a beginning was made to promote horticultural development. A scheme for development of fruit production was included in the State Plans and a sum of Rs. 5 crores was allotted. As a result, about 2.88 lakh acres were newly planted to fruit trees and about 1.9 lakh acres of bearing orchards were subjected to renovation measures. Alongside of this basic developmental programme, supporting activities were also initiated. Training of gardeners in the specialised techniques of improved fruit-farming practices was taken on hand and as many as 5,046 persons were equipped with the technical know-how of commercial orcharding in different States.

Third Five Year Plan

The scope of fruit development in the country was further broad-based for pursuit in the Third Plan. The allotment was increased to Rs. 7 crores and in addition to the continuation of the schemes in operation, others for establishing Progeny Orchard-cum-Nurseries, and setting up of Garden Colonies were newly proposed. The targets and the progress made during the Third Plan up to 1962-63 are summarised below :

Scheme	Target for Third Plan	Achievement up to 1962-63
1. Fruit Development		
(a) New orchards (lakh acres)	3.37	1.28
(b) Renovation of old orchards	5.30	1.31
2. Training of Gardeners (No.)	5,260	1,359
3. Establishment of Progeny Orchard-cum-Nursery (No.)	39	28
4. Setting up Garden Colonies (No.)	50	2

As supporting activities towards the achievement of targets under the main schemes described above, items such as establishment of a National Hortorium and offer of grants-in-aid to Agri-Horticultural Societies were taken up. The former has been set up and nine Societies have availed so far of the monetary assistance granted to them.

✓ Vegetable Production in Third Five Year Plan

A new scheme for vegetable production was also launched in the Third Plan with an estimated outlay of Rs. 47 lakhs. A start has been made on the premises that at the beginning of the Plan the total acreage under vegetables was a little over 20.70 lakhs of hectares and this is to be increased by the addition of 30,900 hectares in the five year period. The scheme, however, has not made much headway as most of the States have not yet actually put it into operation though provisions have been made in their individual Plans.

Vegetables are nearly the cheapest source of natural protective foods, contributing both vitamins and mineral elements to the dietary. Their importance in this respect, however, is not as yet sufficiently appreciated and they are mainly consumed if at all, more as an added relish to a cereal meal. Recognition of vegetables as a staple item in the daily dietary is inescapable at least in the future because they yield roughly three to four times the food obtained from cereal crops in a unit area and there is the added advantage that this is obtained in a much shorter time.

At present, vegetable production caters mainly to the needs of cities and other urban areas. With the progressive development of irrigation facilities and promotion of school education in rural

areas, a trend towards diversification in farming to provide for cultivation of kitchen and market gardening is perceptible. 'Truck' farming is also in evidence wherever adequate marketing facilities are available. The production and consumption of vegetables in the more remotely situated villages, however, are still deplorable and are confined to raising some greens in winter and a few easily-grown cucurbits in summer. Inadequacy of good quality seeds and a lack of knowledge of the cultural peculiarities of the different kinds and varieties of vegetables hinder the promotion of kitchen gardening in such areas and needs to be promoted under special schemes. Extended demonstrations by laying out model kitchen gardens, gratis supply of seeds, fertilizers and free plant protection service in the first phase of development of vegetable-growing in these areas would go a long way. Competitions in vegetable-growing to include varietal collections, yields, quality, new farming practices evolved by the farmers to accommodate vegetable crops in the seasonal cropping can all be organised, on village, village level worker and block basis. Kitchen garden clubs can be organised in village schools and the land that is usually attached to the rural schools can be pressed into service as a training ground for boys in vegetable cultivation. Garden tools, good seeds, fertilizers and pesticides can be supplied free of cost. The student members of these clubs should be permitted to carry the vegetables to their homes which in the first instance will induce the elder members of the family to eat them and in due course serve as a provocation for them to take up to vegetable growing in a bigger way than what is possible in a school. The seeds produced in the school may also be distributed amongst the students for use in their home gardens.

CHAPTER III

GUIDELINES FOR THE FORMULATION OF FOURTH FIVE YEAR PLAN PROPOSALS

THE PROBLEM of an adequate and reasonably-priced supply of fruits and vegetables to the cities and urban areas has assumed a progressively insistent tone in the recent past. A scheme to meet the needs was drawn up at the Centre and referred to the States several of whom reported that they had their own programmes which had been taken on hand. Future lines of approach to meet this demand would lie in the direction of selecting the fruit and vegetable varieties that lend themselves to cultivation in the neighbourhood of each city in such a manner and in the several seasons as to ensure continuity of supplies, to gather produce from other areas if necessary during scarcity periods and make the necessary arrangements for its transport, supply or cold storage. Pilot studies in a few cities to bring out the underlying problems and the steps to be taken to meet them would help in drawing up a plan that can be used by all other cities to meet their own particular requirements and needs.

Need for Kitchen Gardens

It is highly desirable to promote kitchen gardening in towns to reduce the dependence of the family with moderate means on costly market supplies of their daily vegetable or fruit supplies. Towards this end and as an inducement, the dwellers of houses with small compounds can be supplied seeds and plants of fruits and vegetables as well as ornamental plants from easily accessible service centres. They can be the Agri-Horticultural Societies or nurserymen enlisted for the purpose. This would also result in an increasing demand for *malies* for part-time assistance. A scheme for training suitable men for such service has to be drawn up and implemented under the Plan.

Why Selective Basis

The increasing tempo of horticultural expansion in the country demands that the available resources of men, materials and money are put to the best use in all our future planning. Fruit production has now to assume a selective basis. It will not do in future to merely strive at a mass uplift of gross production figures. It will be

essential to aim simultaneously at meeting (i) the challenge of competing crops for yielding to the primary producer the maximum monetary returns, (ii) the specialised demands of the 'products' industry and (iii) the critical requirements of export markets. In regard to the first, the fruit-grower faces certain serious limitations. Inducements for investment in the cultivation of perennial fruit crops are generally lacking, particularly in view of the prolonged pre-bearing period when the crop brings practically only small monetary returns from the short duration inter-cultivated crops. The ceiling on ownership of land is hardly calculated to enthruse the farmer to divert his small holding to widely spaced perennial trees. In regard to the demands of the products industry, the widely dispersed fruit area is not conducive to extend the area under only a few varieties which the factories are in need of. In any event, the special attributes of canning varieties such as size, storage capacity, requisite maturity on a dated schedule and above all, their 'processibility' have yet to be precisely described and the evolution of suitable types taken up under a sustained research programme or by the introduction of new germ plasm procured from available sources elsewhere. So far as exportable produce is concerned, the consumer preferences are specific, exacting and sophisticated, particularly in the highly developed western countries and not only is it necessary to produce sufficiently of these varieties but their specifications, grades and qualities have also to be standardised alongside of protecting the fruits against spoilage through damage and decay by the adoption of improved methods and agencies for packing, transport and shipping of the produce. Vegetable production whether for home marketing, canning, dehydration or export needs has to assume the dimensions of 'truck' farming in contrast to the erstwhile 'kitchen' or 'market' gardening. It is only then that intricate problems of marketing, dispersal, storage, etc., could be resolved and the hierarchy of middlemen and intermediaries who are now creating more problems than they were solving formerly can be broken into with benefits to the primary producer and advantages to the consumer.

Problems to be Tackled

A broad review of horticultural research that has been in progress over the past few decades serves only to emphasise that it has in the main helped in solving the simpler problems of local importance confronting the farmers in the several States. The basic problems and fundamental aspects, however, have yet to be taken up on a scale and in a manner to resolve the bigger issues. Fruit orchards in which variability in yield performance and fruit quality are even now more the rule than the exception. Serious diseases and pests

like the blights of potato, viroses of citrus, banana, hill fruits and vegetables, the undiagnosed malady of inflorescence and leaf malformation in mango, abnormal flower shedding and immature fruit drop in most of the commercial fruits, irregular cropping in mango and apple and the uncertainties associated with it, premature bolting in vegetable crops, inability to gather seed harvests in late cauliflower variety, lack of rapid and dependable methods for standardising root-stocks for the mango and citrus are all illustrations of the major problems which have to be taken up on a national scale and solved by the use of special techniques made possible through well-equipped central coordinated organisations staffed with competent personnel. A proposal for the establishment of a Central Institute of Horticulture with four or five zonal stations has been drawn up for the purpose and is separately under consideration. Meanwhile, such improved horticultural methods as have resulted so far from the solution of local problems have been utilised to form the basis of a pilot scheme for converting them now into farmers' practices.

In all the Plans for the future, it will be necessary to keep prominently in view of the basic fact that all planning in the country is aimed at improving the general standard of living. Not only more food but also better food would be in demand. Fruits like apples, grapes, etc., and products such as fruit juices, squashes, jams and preserves, which are now largely beyond the reach of the generality of our people shall have to be sufficiently in abundance to meet their rising popularity with the masses.

If these several needs are to be met in any intelligent manner, the policy of *laissez-faire* shall have to be given up and purposive planning brought to bear on all the horticultural programmes. There is hardly any "Fruit Intelligence" in our country at present which provides information in advance of the anticipated crops in any season. Such data would be of the greatest value in an equitable distribution, price fixation and execution of trade agreements in export markets. It would also help the fruit product industries to formulate their outputs of each product. Development of commercial production of fruit and vegetable production for instance, shall have to be confined to areas which offer the largest natural and the highest comparative advantages. It would then be necessary to provide the growers in these areas with cheap supplies and advisory services, as well as to make adequate and timely arrangements for packing transport and storage of the produce, protecting it against damage and decay and for marketing it at reasonable prices to the consumer. Credit is, indeed, highly important to facilitate a build-up of com-

mercial crops and long and short-term loans shall have to be made readily available on such terms as will be markedly more attractive than those offered by the traditional village agencies.

Garden Colonies

The scheme for setting up of Garden Colonies was conceived earlier to attract agricultural graduates who would like to make fruit-growing their main avocation in life. This has not had encouraging response and may need some major changes. Perhaps in a projection over a ten-year period from now, it will not be out of place to visualise the setting up of an Orchard Development Corporation for developing wastelands or areas likely to be commanded by irrigation projects in different States alongside of the setting up of Garden Colonies. In notified areas as are considered suitable, the Corporation can establish orchards in compact areas and only such kinds and varieties of fruits that are promising in the selected tracts. When these orchards reach their bearing age, these can be offered for sale to the public. The Act promulgated to establish the Corporation may notify also the list of holdings which are bound by its provisions and those which do not conform to the obligations spelt out, the Orchard Development Corporation should have the power to undertake the work and charge the expenses to the respective owners.

Avoiding Wastage

The losses in handling fruits and vegetables are quite considerable. A major problem in handling them, therefore, lies in the direction of adopting methods to reduce damage and decay during transport and storage and in the processes of marketing. Work on the storage aspects has been in progress at the Central Food Technological Research Institute at Mysore but a detailed integrated approach of handling, transportation and storage with a view to improving marketing and increasing storage life of fruits and vegetables has not been made on a regional basis. Storage of some of the highly perishable commodities which can be kept for longer periods with the aid of refrigeration is not possible at present because of lack of proper transportation facilities. No detailed studies on bulk transportation of such commodities has so far been made. Furthermore studies on the insulation, condensation of moisture in the cold stores or refrigerated transport and mode of stacking which have a vital bearing on their export point of view have not been systematically pursued. A comprehensive scheme dealing with these aspects is overdue and its implementation at least in the Fourth Plan will be quite in keeping with the several other efforts for increasing production.

Marketing

✓ The marketing of horticultural products poses certain peculiar problems on account of the special features involved in their assembling, packing, storage, transportation and distribution. The highly perishable nature of fruits and vegetables, the restriction of their production to specific concentrated areas, the universal demand for these from every section of population all round the year, the large-scale movement of these commodities from the producing areas in one State to the far-off consuming areas in others—all these pose problems in the marketing of horticultural products.

✓ In the collection of fruits and vegetables from the producing areas and their assembling in the market centres, which constitute an important first stage in their marketing, the participation of the producers is far from adequate at present; a host of middlemen like village merchants, itinerant merchants, pre-harvest contractors, etc., taking their place. Such intermediaries, particularly the pre-harvest contractors, without actually doing much in the process of marketing, appropriate to themselves a sizeable share of the producers' legitimate dues. It is, therefore, necessary that the producers of fruits and vegetables are encouraged to participate to a greater extent in the assembling of these commodities. This could be best done by the producers in each locality organising themselves into cooperatives.

The production of most of the fruits and vegetables is highly seasonal and owing to their perishable nature, the producers are not in a position to phase the supply of these commodities. Seasonal gluts are, therefore, a common phenomenon in all the assembling markets in years of normal production. The heavy fluctuation in their supplies during different months of the year results in violent changes in their prices in consuming markets. Abnormally high prices during the lean months and subnormally low prices during the period of peak arrivals are not uncommon in major consuming centres. For example, in Calcutta market prices of green peas fluctuated between Rs. 72.50 per quintal during May and Rs. 211.05 per quintal during September during 1961-62 season. Cold-storing of fruits and vegetables as a measure against seasonal gluts in the markets has come to be well-recognised but the number of cold storages set up so far in the urban areas is so inadequate that it has hardly any impact in regulating the supplies in the urban markets. Seasonal gluts, thus, are usual in the urban areas as well. Provision of more cold storage units in all major consuming centres and the establishment of processing and preservation units near about the areas of production to absorb the

surplus production during the season will help considerably in preventing the now frequent market gluts.

It is only in Ahmedabad and few other markets in Gujarat that the marketing of fruits and vegetables has been brought under regulation. In all other places, trade in fruits and vegetables is carried on by traditional methods. Unauthorised and arbitrary deductions like *dharmada*, postage, etc., are quite common. Auction method of sale which ensures competitive rates to the seller is rarely followed and the rates of commission charged are often exorbitant. In order to bring the benefits of market regulation to the producers of these commodities, the possibilities of regulating the fruit and vegetable marketing, at least in major consuming cities, require immediate consideration. In some cities like Calcutta, the markets—both private and corporation's—have provided a number of temporary stalls, where, for payment of a nominal market fee, any seller can offer his produce for sale directly to the consumers without the assistance or intervention of intermediaries. This facility for direct sale has been responsible in no small way in encouraging the producers to bring their fruits and vegetables to the city market for sale instead of disposing at the farm. Such facilities for direct sale, if provided in all city and town markets, will result in increasing the participation of the growers in the marketing of fruits and vegetables.

The packaging practices followed in the country in respect of fruits and vegetables are old and traditional. The containers used, vary much in their size, shape and capacity. Often times the practices followed in the packing of fruits and vegetables are dictated by the availability of raw material in the areas of production and not by their suitability for particular fruits or vegetables. The loss of fruits and vegetables every year on account of unsuitability of the containers and the improper methods of packing is not insignificant. Fruits like oranges, pineapple, mango, etc., are sometimes carried loose in trucks without any packaging, resulting in heavy damages. Damaged baskets, torn gunny bags and the like are indiscriminately used for carrying fruits and vegetables from the farm to the assembling markets. The substantial wastage that is the rule in almost every market could be easily avoided by taking care in using proper containers and by adopting correct packaging techniques. Containers like baskets used for long distant transport of fruits like mango, pineapple, etc., can be replaced by wooden crates and cases as far as possible. These containers, although costlier, give the much needed protection to the packed material during the long journey. Such containers could also be used a number of times and should be also economical

if made returnable. Time is a very important factor in the transportation of commodities like fruits and vegetables. Their highly perishable nature requires that their entire movement from the areas of production to the ultimate consumers is carried out as expeditiously as possible so that the materials may remain reasonably fresh by the time they reach the consumers. But some of the major fruit producing areas in the interior in States like Assam are so poorly served with communication facilities that the fruits are many days old by the time they reach assembling markets. Carrying the fruit from the areas of production to the assembling points entails much delay and heavy costs, with the result that substantial quantities of fruits like orange, pineapple, etc., never get assembled from the growing areas. There is, therefore, an immediate need for the improvement of communication facilities in those areas. Another problem is the heavy loss sustained due to the frequent delays involved in the carriage of perishable fruits by rail. Delicate fruits like pineapple have to be transported as quickly as possible. Instances are not rare when entire consignments of such fruits have gone waste due to their failure to reach destination in time. The metallic wagons in which the bulk of fruits and vegetables is carried are unsuitable for the purpose, on account of the heat generated inside the loaded wagons, which results in considerable spoilage of the fruits and vegetables during transit. Provision of refrigerated vans during summer months for the carriage of delicate fruits like grapes deserves more attention.

Systematic grading of fruits and vegetables, based on scientific grade standards, is almost completely absent in the country. Grading of the produce at the farm by the producer himself is seldom practised. At best, what the grower does is to remove from the bulk, immature, rotten or diseased fruits or vegetables. Some sort of grading is attempted by the traders only at the assembling stage. Fruits like mango, apple, lime, pineapple, sapota, orange, etc., are generally graded on the basis of size and variety at the despatching ends before sending to consuming centres. But the grading methods followed by the trade at present are not based on any recognised grade standards. What is followed in one area is entirely different from another area thus creating confusion in the trade. This can be avoided if the entire fruit trade adopts the Agmark grade standards. Best results could be achieved if grading of fruits and vegetables commences at the farm and is carried out by the producers themselves. This will help not only in securing for them the extra margin that now goes to the retailer who invariably resorts

to grading or sorting before sale, but also in facilitating easy marketing of these commodities in major consuming cities.

Recent surveys conducted by the Directorate of Marketing and Inspection on the marketing of fruits and vegetables indicate that the net return to the producer in the consumer's price is comparatively low. This is the result of a number of contributing factors among which the heavy transportation costs and the longer margins of the wholesale and retail merchants are the two most important. But in a commodity like this where long distant transport is inevitable, the transportation costs are bound to be high. Similarly, because of greater hazards involved in handling, transport and storage of perishables, the retailers will always work on a higher margin so as to compensate possible loss if any. Therefore, any appreciable reduction in the retailer's margin may not also be possible. It, thus, appears that the net return to the producers could only be increased by eliminating such intermediaries like itinerant merchants, commission agents, etc. This is possible if the producers have greater participation in the assembling and distribution of these horticultural products.

While the prime emphasis has been laid in the Fourth Plan schemes on increasing the output of fruits and vegetables, the aspects of ornamental horticulture have been taken care of under the scheme for giving financial assistance to private and cooperative organisations such as Agri-Horticultural Societies and others. In addition to all these, two other schemes, one for developing cocoa cultivation and other for growing mushrooms on a large scale have also been included as they have a fairly important role in the overall horticultural progress in the country.

CHAPTER IV

SCHEMES FORMULATED FOR THE FOURTH FIVE YEAR PLAN

THE following individual schemes for operation in the Fourth Plan period have been drawn up more or less with this broad outline as a general basis to work upon. Under each scheme, due consideration has been given to delineate in a general manner the objectives, the need for the scheme, a critical review of the scheme as it has been working during the Third Plan period, the projections for the Fourth and Fifth Plans, advance action, if any, to be taken in the Third Plan, the facilities offered under the scheme, the staffing pattern, overall financial implications, foreign exchange requirements and the credit required.

	Fourth Plan outlay (Rs. in lakhs)
1. Scheme for Fruit Production	
(i) General Development of Fruit Production	1,928.00
(ii) Augmenting Fruit Production in areas favourably situated	1,207.27
(iii) Development of Fruit Production for export purposes	289.00
2. Training of Gardeners	96.00
3. Establishment of Garden Colonies and Orchard Development Corporation in India	300.00
4. Establishment of Progeny Orchards and Nurseries	125.84
5. Financial assistance to private and cooperative organisations such as Agri-Horticultural Societies and others to promote Horticulture	15.00
6. Cocoa Development Scheme	10.69
7. Certification, Inspection and Registration of virus-free trees	13.50
8. Maturity Standards of fruits in relation to packing and refrigerated transport	15.00
9. Establishment of new plant introduction units and development of National Hortoria	13.58
10. Potato-seed development scheme	856.12
11. Development of vegetable production	162.40
Total	<u>5,032.40</u>

The overall provision for Horticulture during the Fourth Plan period for the above scheme is thus placed at Rs. 5,032.40 lakhs out of which Rs. 4,047.02 lakhs will be for medium and long-term loans.

1. SCHEME FOR FRUIT PRODUCTION

1 (i) Scheme for the General Development of Fruit Production

Objectives. This is a continuation of a Second and Third Plan scheme. A start was made on the premise that the total area under fruit at the beginning of the Second Plan was 11.2 lakh hectares (28 lakh acres). The target to be achieved at the end of the Fifth Plan is to reach a figure of roughly 16 lakh hectares or 48 lakh acres.

Resume of Work So Far Done. During the Second Plan period, the achievements were planting of 2,88,730 acres under new orchards and rejuvenation of 1,86,450 acres of old orchards.

For the Third Plan period the final targets for the new orchards are 3.37 lakh acres and 5.30 lakh acres for rejuvenation of old orchards. Against these targets, the achievements so far, i.e., up to 1962-63 are new orchards 1,28,219 acres and rejuvenated 1,31,152 acres. The scheme has been taken up in all the States except Orissa and Assam, who have development schemes of their own. Andhra Pradesh discontinued the scheme in February, 1963. However, revival of this scheme as a result of savings available from the adjustments of other schemes is under consideration.

Facilities Offered. With a view to maintaining the tempo of progress under this scheme it is proposed to continue it in the Fourth Plan and Fifth Plan also with the same facilities, viz., grant of loans at the rate of Rs. 740 per hectare (Rs. 300 per acre) in the plains and Rs. 1,240 per hectare (Rs. 500 per acre) on the hills and Rs. 3,700 per hectare (Rs. 1,500 per acre) for grapes. Short-term loans at the rate of Rs. 160 per hectare (Rs. 65 per acre) may also be provided for rejuvenation of old orchards outside the Plan.

Projections for the Fourth and Fifth Plans with Financial Implications. Targets for the Fourth Plan for planting of new orchards have been fixed at 2.43 lakh hectares (6 lakh acres). For the rejuvenation of old orchards, a 10 per cent increase over 5.30 lakh acres (2.15 lakh hectares) finally fixed for the Third Plan have also been indicated. The total outlay for the Fourth Plan works out to about Rs. 1,928 lakhs.

For the Fifth Plan the targets for planting of new orchards and the anticipated lay-out, therefore, has been worked out at 3.24 lakh hectares (8 lakh acres) and Rs. 2,528 lakhs respectively.

The details of total projections for Third and Fourth Plans and anticipated lay-out for the Fifth Plan are as under.

	OUTLAY FOR THIRD PLAN	PROJECTIONS FOR FOURTH PLAN	ANTICIPATED FOR FIFTH PLAN
1. Targets for—(lakh-acres)	3.37	6.00	8
Planning of new orchards (lakh-hectares)	(1.36)	(2.43)	(3.24)
2. Targets of rejuvenation (lakh-acres) of old orchards (lakh-hectares)	5.30 (2.15)	5.83 (2.36)	6.40 (2.59)
3. Expenditure on staff & contingencies at the headquarters (lakh-Rs.)	3.30	3.40	3.60
4. Expenditure on staff & contingencies in the States (lakh-Rs.)	124.60	124.60	124.60
5. Long-term loans at the rate of Rs. 300 per acre for planting new orchards (lakh-Rs.)	1011.45	1800.00	2400
Total Plan-outlay (lakh-Rs.)	1,139.35	1,928.00	2,528.20
Short-term loans at the rate of Rs. 65 per acre for rejuvenation of old orchards (lakh-Rs.)	344.50	377.95 (to be treated outside the Plan)	416.00

By the end of the Fourth Plan, the total area under fruits is estimated to reach about 40 lakh-acres or 16.2 lakh-hectares and that at the end of Fifth Plan period the total area will be roughly 48 lakh-acres or 19.51 lakh-hectares.

Foreign Exchange Requirements. Nil.

Supervision of the Scheme. It is a non-pattern scheme and expenditure on this scheme will have to be met by the States from their plan ceilings. The assessment of the targets will, however, be coordinated by the Centre including the technical aspects.

Credit Required. A sum of Rs. 1,800 lakhs has been provided to meet the long-term loan requirements of the fruit growers with a similar provision of Rs. 377.95 lakhs towards short term loans to be met outside the Plan.

1. (ii) Scheme for Augmenting Fruit Production in favourably situated areas for the Commercial Cultivation of Apples, Sweet Oranges, Banana, Grapes, Pineapple, Mandarin and Acid lime

Objectives. This is a new scheme complementary to the general fruit development scheme. It aims to promote rapid extension of

area under apples, sweet oranges (Malta type), banana, grapes, pineapples, mandarins and acid limes in areas with the highest comparative advantages, by providing greater incentives in the form of enhanced loans partly intended for meeting investment on the installation of tube-wells or other modes of irrigation, provision of spray equipment, etc. The loans will be recovered from the end of fifth year in 100 annual instalments. In the case of short-term fruit crops like banana and pineapple, grants of loans will be subject to the condition that the plantation will be maintained on a perennial basis. The applicants for loans towards fruit-growing in the selected areas will not be eligible for any other long-term loans for the same purpose.

Facilities Offered. The crops selected for rapid expansion of areas, together with the States involved and the proposed enhanced loans along with the additional area to be covered and the expenditure involved are indicated below.

NAME OF THE CROP	NAME OF THE STATE	EXISTING ESTI-MATED AREA* (HECTARES)	ADDITIONAL AREA TO BE COVERED (HECTARES)	LOANS RATE (PER HECTARE)	EXPENDITURE ON LOANS (RS. ROUND)	
1	2	3	4	5	6	
1. Apple	Punjab	300	1,000	3,750	37,50,000	
	Himachal Pradesh	1,250	1,000		37,50,000	
	Uttar Pradesh	2,610	1,000		37,50,000	
	Jammu & Kashmir	3,240	1,000		37,50,000	
	Additional Area :		4,000			
	Total for Apple :				150,00,000	
2. Sweet Orange	Dist. Ferozepur, Punjab	4,050	2,025	1,235	25,00,000	
	Dist. Sri-Ganganagar, Rajasthan	1,215	2,025		25,00,000	
	Additional area :	4,050				
	Total for Sweet Orange :					50,00,000
3. Banana	Maharashtra	23,370	2,025	4,940	100,00,000	
	Gujarat	7,670	2,025		100,00,000	
	Madras	33,140	2,025		100,00,000	
	Mysore	18,000	2,025		100,00,000	
	Orissa	4,540	2,025		100,00,000	
	Andhra Pradesh	10,360	2,025		100,00,000	
	West Bengal	12,900	1,215		60,00,000	
	Additional area :		13,365			
	Total for Banana :				660,00,000	
4. Grape	Punjab	30	1,000	3,750	37,50,000	
	Maharashtra	1,060	1,000		37,50,000	
	Andhra Pradesh	110	1,000		37,50,000	

1	2	3*	4	5	6
	Madras	240	1,000		37,50,000
	Mysore	760	1,000		37,50,000
	Additional area :		5,000		
	Total for Grape :				187,50,000
5.	Pine-apple	2,150	1,000	1,235	12,35,000
	Kerala	150	1,000		12,35,000
	Tripura	1,010	1,000		12,35,000
	West Bengal	640	500		6,17,500
	Additional area :		3,500		
	Total for Pineapple :				43,22,500
6.	Mandarin Orange	8,100	2,025	1,235	25,00,000
	Coorg				
	Mysore				
	Nagpur, Maharashtra	3,125	2,025		25,00,000
	Additional area :		4,050		
	Total for Mandarin :				50,00,000
7.	Acid lime		2,025	1,235	25,00,000
	Kodur, A. P., Jalgaon Dist.				
	Maharashtra		2,025		25,00,000
	Additional area :		4,050		
	Total for Acid lime :				50,00,000

* Figures of 1961-62 Survey Report by the Agriculture Marketing Directorate, Ministry of Food & Agriculture, Nagpur.

For a rapid expansion of the area under these fruits, an essential requirement is an adequate supply of nursery plant materials. Under a separate scheme of progeny orchard-cum-nurseries due provision towards this has been made.

In all 38,015 additional hectares will be brought under fruits by the end of the fourth Plan.

Staff Pattern. The field staff in these selected States will be augmented to intensify extension work with a view to promoting rapid extension of the selected areas. It is estimated that additional 58 horticultural assistants and 58 *malies* will be required, to be distributed on a pro-rata basis, to strengthen the existing staff in these areas. The total expenditure on this account will be about Rs. 16.55 lakhs.

Financial Outlay. The total outlay envisaged under the Fourth Plan for this scheme is estimated at Rs. 1,207.27 lakhs in the form of loans and expenditure on additional staffing.

Foreign Exchange Requirements. Nil.

Supervision of the Scheme. This will be non-pattern scheme and the essential expenditure on this scheme will have to be met by

the States from their plan ceilings under the scheme for general development of fruit production. The assessment of the targets including the technical aspects will, however, be coordinated by the Centre.

Credit Required

<i>Loans</i>	<i>Lakh Rs.</i>
Apples	150
Sweet Oranges	50
Bananas	660
Grapes	187.50
Pineapples	43.22
Mandarins	50
Acid limes	50
	1,190.72
Total Loans	

Therefore, a provision of Rs. 1,190.72 lakhs has been made for loans to the growers.

In addition to the above, short-term loans at Rs. 65 per acre for rejuvenation of old orchards are to be offered if required, but these will be outside the Plan.

1. (iii) Scheme for the Development of Fruit Production for Export Purposes

Objectives. This is a new scheme proposed to be launched in the Fourth Plan. Under this scheme it is proposed to launch production of crops such as banana, citrus (mandarin and acid lime), mango and pineapple on a campaign basis for export purposes. The aim under this scheme is to commercialise production of selected varieties of these fruits, in areas which are ideally suited to them.

Need for the Scheme. A progressively expanding outlet for our fruit crops is being created as a result of the concerted drive by the Union Ministries of Food and Agriculture and International Trade. The preferences for certain specific varieties have to be kept prominently in view in all production promotion measures for export. A similar situation prevails in respect of product industries which are clamouring for produce from varieties particularly suitable for the manufacture of the products. Hence, the need for developing fruit industry on a specialised basis.

Position So Far. The Ministry of International Trade has taken up export of banana, variety Basrai, with an immediate target of 23,000 tons. It is also proposed to export 3,000 tons of mango and 6,000 tons of citrus annually. No targets have yet been laid for pineapple.

Projections for the Fourth and Fifth Plans. The export outlets are expected to increase progressively though it is not possible to predict this on any quantitative basis at this stage.

Facilities Offered under the Scheme. Under this scheme it is proposed to give plant material and fertilizers at a concessional rate and free plant protection service on a mass campaign basis. Long-term loans to growers operating under this scheme will be offered at the following rates :

Banana	=	Rs. 2,000/- per acre	or	Rs. 4,940 per hectare
Mango	=	Rs. 300/- per acre	or	Rs. 740 per hectare
Citrus	=	Rs. 500/- per acre	or	Rs. 1,235 per hectare
Pineapple	=	Rs. 500/- per acre	or	Rs. 1,235 per hectare

Provision is made for the purchase of cold storage vans the lack of which is the chief bottleneck at present in the transport of produce from the production centre to the shipping centre.

In all, there will be about 15 export promotion centres as follows :

Banana—3, Mango—4, Citrus—5 and Pineapple—3

The approximate new area to be covered under each crop would be as indicated under :

Banana	—	1,700 acres	or	689 hectares
Mango	—	1,500 acres	or	608 hectares
Citrus	—	3,000 acres	or	1,215 hectares
Pineapple	—	1,000 acres	or	405 hectares

The total new area to be brought under cultivation will be thus about 2,900 hectares.

Staff Pattern. For each centre it is proposed to have one Horticulture Inspector and two Fieldmen who will do the inspection and render technical service.

Financial Implications. The following will be the estimated expenditure on the various items :

	<i>Lakh Rs.</i>
1. Staff : for setting up Inspection Service (<i>ad hoc</i> provision)	5.00
2. Loans : long and short-term loans to the growers	58.50
3. Provision for Cold Storage Vans :	
100 cold storage vans at the rate of Rs. 1 lakh per van	100.00

4. Expenditure on mass campaign of Plant Protection	20.00
5. Expenditure on supply of fertilizers at concessional rates	75.00
Expenditure on setting up of nurseries at Rs. 1.72 lakh per centre for 15 centres	30.00
Grand Total	<u>Rs. 288.50 lakhs</u> or Rs. 289 lakhs (round)

Foreign Exchange Requirements. For equipping 100 cold storage vans [it would be necessary to import refrigeration equipment worth Rs. 35 lakhs at the rate of Rs. 30,000 for each cold storage van.

Credit Required. A provision of Rs. 58.50 lakhs has been made for issue of loans to growers requiring credit.

Summary

According to these three fruit production schemes, the total new area under fruits by the end of the Fourth Plan together with the corresponding total outlay will be as under :

<i>Scheme</i>	<i>Area in hectares</i>	<i>Financial outlay (lakh-Rs.)</i>
(i) General Fruit Production Scheme	2.43	1,928
(ii) Rapid Expansion Areas	0.38	1,207.27
(iii) Export Promotion Areas	00.03	289
Grand Total	<u>2.84</u>	<u>3,424.27</u>

The total increase in the new area in the Fourth Plan over the Third Plan will be cent per cent. By the end of the Fourth Plan, the total area under fruits will be about 19.04 lakh hectares.

2. TRAINING OF GARDENERS

Objectives. This is a continuation of the Second and Third Plan scheme. The scheme is essential to implement the programme of development of general fruit development scheme, as well as to provide *mali* service for kitchen gardening in cities.

Resume of Work so Far Done. During the Second Plan, 5,046 gardeners were trained. In the Third Plan it is proposed to train 5,260 gardeners. So far till 1962-63, during the Third Plan 1,359 ardeners have been trained.

Facilities Offered. It is proposed to continue this scheme in the Fourth and Fifth Plans also with an added facility, viz., enhanced monthly rate of Rs. 80 (Rs. 50 for stipend and Rs. 30 for expenditure) per candidate in view of the steady rise in wage rates for skilled labour. The previous rate was Rs. 50 (Rs. 30 for stipend and Rs. 20 for expenditure). In addition, provision has been made for sanctioning apprenticeships to various institutions such as agricultural colleges, agri-horticultural societies, commercial nurserymen, horticulture departments of C.P.W.D. or State P.W.D., nurserymen, corporations of big cities, etc. which would like to impart training to *malies* for kitchen gardens. It is estimated that there would be about 50 such agencies in India and each agency may train about 10 *malies* a year. Thus an addition of 2,500 *malies* are expected to be trained by the end of Fourth Plan.

Projections for the Fourth and Fifth Plans. For the Fourth Plan, the target of garden trainees has been fixed at 10,000 gardeners (7,500 by State Govts., 2,500 by private agencies).

For the Fifth Plan the targets have also been indicated at 15,000 garden trainees.

The total projections for the Fourth Plan and anticipated layout for the Fifth Plan are indicated below.

	Physical targets	Expenditure provision Lakh rupees
Third Plan	5,261	27.02
Fourth Plan	10,000	96.00
Fifth Plan	15,000	144.00

Foreign Exchange Requirements. Nil.

Supervision of the Scheme. It is a non-pattern category "B" scheme and expenditure on this scheme will have to be met by the States from their Plan ceilings. The assessment of the targets will, however, be coordinated by the Centre, including the technical aspects.

Credit Required. Nil,

3. ESTABLISHMENT OF GARDEN COLONIES AND ORCHARD DEVELOPMENT CORPORATION IN INDIA

Objectives. The object of this scheme is to develop orchards on scientific and modern lines through persons who have shown evidence of an abiding interest in horticulture and who are willing to

invest time and money in fruit growing as a whole-time occupation.

Garden colonies will be established wherever possible in areas where existing owners of small orchard holdings and prospective fruit growers are desirous of forming such colonies or in suitable areas lying uncultivated or as wastelands likely to be commanded by various irrigation projects. An Orchard Development Corporation is proposed to be set up by the Government of India for developing wastelands or other suitable areas and cultivating only such kinds and varieties of fruits that are promising in the selected tracts and have export market.

Under the garden colonies, the existing owners will be offered all the facilities required for forming into a colony or plots of land will be offered to such persons as are interested in horticulture and are agreeable to the stipulated conditions of the colony. The individual members of the colony will be at liberty to plant those kinds and varieties of fruits that are to their particular liking. The lands under the Orchard Development Corporation will, in the first instance, be developed into fruit orchards and will then be offered for sale to the public at reasonable rates roughly five to seven years later when the trees come to bearing age after dividing the same into 8 to 12-hectare plots.

Government servants who are desirous of purchasing plots developed by the Corporation could acquire them by getting themselves registered with the Corporation. The Corporation will receive annual premia from the registered persons and will hand over the developed orchards after a stipulated period which may range from 5 to 7 years to those persons on retirement. In case of premature demise of any person registered with the Corporation, the ownership of the orchard will pass on to the legal heirs at the end of the stipulated period without payment of any further premia.

The Need for the Scheme. It is observed that many among the educated class of persons do not settle down in villages and have a tendency to drift to big towns and cities. Consequently, many horticultural crops, which demand specialised skill and knowledge for their successful cultivation, remain in the hands of the general farmers. This obstructs the establishment of orchards on modern, and scientific commercial lines. It is, therefore, necessary that steps are taken to induce educated persons or Government servants on retirement to settle on lands which are left uncultivated for one reason or other.

The Government lands and other private lands lying waste will be made productive and the horticultural crops grown there will not only add to the output of fruits in the country, but will also help in developing export marketing.

Critical Review of the Progress of the Third Plan Scheme and the Position likely to be Reached by the End of the Third Five Year Plan

A scheme for the establishment of garden colonies in India was started in the Third Five Year Plan and a target of 50 garden colonies was originally laid down. However, out of these only two colonies in Himachal Pradesh have been established so far and another two are proposed to be established, by the end of Third Plan. Orissa and Tripura Administration are likely to take up this scheme shortly. As the scheme has not met with any encouraging response from most of the States, some modifications have been suggested to make it more attractive to the prospective fruit growers. In addition the scheme envisages development of lands into orchards on modern, scientific lines through an Orchard Development Corporation.

Projections for the Fourth and Fifth Plans. The scheme will start functioning from the Fourth Plan and will continue in the Fifth Plan also on the same pattern. The work under the scheme, however, is likely to expand in the Fifth Plan.

Advance Action to be Taken in the Third Plan. The new scheme will be circulated to the State Governments likely to take up this work. Areas for the establishment of garden colonies will be selected by the end of Third Plan so that the work can be started from the beginning of the Fourth Plan.

Steps will be taken to clear all the formalities in the setting up of the Orchard Development Corporation by the Government of India in the Third Plan. An Officer-on-Special-Duty will be appointed to take advance action on different phases of the setting up of the Corporation, select the areas in the different States so that there is no delay in the implementation of the scheme at the beginning of the Fourth Plan.

Facilities Offered under the Scheme

(A) ESTABLISHMENT OF GARDEN COLONIES : Compact areas covering 1000 to 1500 hectares or more in the plains and 50 to 100 hectares in the hills will be selected by the State authorities in consultation with the officers of the Government of India. After the site is approved, detailed plans to develop the land into garden colonies will be

prepared. For fruits like mango, guava and citrus in the plains, the plots will be divided into 8 to 12 hectares each. For fruit plants like bananas, grapes and pineapple, the size of plots will be restricted from four to six hectares in the plains. Areas of plots in hills under the temperate fruits like apple, pear, peach, plum, apricot, etc., will be restricted to four hectares each. The scheme will also cover the owners of urban plots who are willing to join and the owners of the lands in rural areas who are willing to come under the stipulated conditions for the setting up of the garden colonies. Applications will be invited from prospective persons interested in the field of horticulture to settle in the garden colonies and their selection made through a Selection Committee. The land will be leased to the colonisers at a nominal rent fixed by the State Government. A 20-hectare piece of land in the plains and 5-hectare piece of land in the hills will be developed by the Government to be utilised for nursery, seed store, implements and plant protection equipment, shed, school, dispensary, shops, library, etc. The staff will be provided by the Government free of cost for giving technical advice and helping in the procurement of plant material, manures, fertilizers, plant protection equipment and grading of produce.

The colonisers will have the benefit of getting supply of plants, seeds, insecticides and fungicides at 50 per cent concessional rates. For the purchase of bullocks, implements, heavy machinery, tubewells, construction of farm structures, etc., loans up to Rs. 5,000 will be provided per family. The colonisers will have individual lease with the promise of ultimate ownership if they have made ownership of land in the colony or will get the land on long lease with the promise of ultimate ownership if they have made good in the working of their holdings. In case of existing owners of lands, all the facilities offered under this scheme will be applicable to them.

(B) DEVELOPMENT OF AREAS THROUGH ORCHARD DEVELOPMENT CORPORATION: The Corporation will be set up by the Government of India with adequate funds to establish orchards in compact blocks of 1,200 to 1,600 hectares with the help of its own staff and adopting scientific techniques. The popular varieties and kinds of fruit preferably of one or two types only will be planted in each area and the orchards will be offered for sale to the public when they have attained the bearing age. The Corporation will be an autonomous body established with the help of Government of India funds in the beginning. The State Governments will give Government lands to the Corporation on nominal long lease. Private holdings in their areas commanded by the Corporation shall be forced by law to

conform to the general pattern of development prescribed for the whole area.

Staff Pattern

(A) **GARDEN COLONIES** : Each colony will have one Horticultural Project Officer (Class II), two Horticultural Inspectors, four Fieldmen, and eight *malies*. As soon as a major area of the garden starts fruiting, the staff will be shifted to undertake work at new sites to be developed under the garden colonies. Thereafter only nucleus staff will be kept to look after the day-to-day work of the garden colony.

(B) **ORCHARD DEVELOPMENT CORPORATION** : The Corporation will be headed by a General Manager with two senior Technical Officers, four Class II Horticultural Development Officers, eight Technical Assistants, an Administrative Officer and necessary office staff at the Centre. Each project will consist of an Orchard Superintendent, four Technical Officers in different fields, eight Technical Assistants, an Accounts Officer, office staff and a number of fieldmen, *beldars* and *malies*.

Duration of the Scheme. The scheme will run in the Fourth and Fifth Five Year Plans and thereafter.

Practical Utility of the Scheme. Most of the Government lands and private lands lying waste in different pockets in the country in the plains and in the hills will be brought under orchards and will not only help in stepping up production of fruits but also assist in the export drive of fresh fruits. The scheme will help to bring 30,000 hectares in the plains and 500 hectares in the hills under fruit orchards during the Fourth Plan. The targets for the Fifth Plan will be 25 per cent more as compared to those laid down for the Fourth Plan. In all 10 Garden Colonies will be established in the plains and five colonies in the hilly areas.

Supervision of the Scheme. The scheme will run as a Central scheme with powers delegated to the Orchard Development Corporation, which will be set up as an autonomous body for actual planting of orchards on modern lines. The overall technical supervision of the garden colonies portion of the scheme will also be coordinated by the Indian Council of Agricultural Research while the technical and administrative control will rest with the State Directors of Agriculture Horticulturists/Fruit Specialists.

Financial Implications

(A) ESTABLISHMENT OF GARDEN COLONIES : The expenditure under each colony (1000 to 1500 hectares) in the plains in the Fourth Plan will be as under :—

	Rs.
(i) Construction of farm houses, school dispensary, nursery, library, seed and implements, stores, etc.	1,50,000
(ii) Staff for five years	1,00,000
(iii) Loans to colonisers @ Rs. 5000 per family (150 families in a colony)	7,50,000
(iv) 50 per cent subsidy for the supply of plant material @ Rs. 1,500 per family (for 150 families)	2,25,000
Total	<u>12,25,000</u>

Expenditure on establishment of 10 colonies in the plains : Rs. 12,15,000 × 10 = 122,50,000

The expenditure on the colonies in the hills will be as under :

	Rs.
(i) Construction of farm houses, school, nursery, dispensary, library, seed and implements store, etc.	1,50,000
(ii) Staff for five years	50,000
(iii) Loans to colonisers at Rs. 5000 per family. (20 families in the colony)	1,00,000
(iv) Subsidy for the supply of plant material etc., at Rs. 2500 per family	50,000
Total	<u>3,50,000</u>

Expenditure on the establishment of five colonies in the hills :

Rs. 3,50,000 × 5 = 17,50,000

Grand total 122,50,000
plus 17,50,000
140,00,000

(B) ORCHARD DEVELOPMENT CORPORATION

(i) Staff at the Centre	10,00,000
(ii) Staff for ten projects	50,00,000
(iii) Cost of heavy machinery, tubewells, buildings, plant protection equipment for 10 projects	50,00,000
(iv) Contingencies, plant material and miscellaneous expenditure	50,00,000
Total outlay of the scheme	<u>1,40,00,000</u>
+ 1,60,00,000	<u>= 3,00,00,000</u>

Foreign Exchange Requirements. Attempts will be made to procure machinery and equipment available locally. No foreign exchange will be required to run the scheme.

Credit Required

LOANS UNDER THE GARDEN COLONIES :

(i) In the plains @ Rs. 7,50,000	× 10 =	Rs. 75,00,000
(ii) In the hills @ Rs. 1,00,000	× 5 =	Rs. 5,00,000
		<u>Rs. 80,00,000</u>

A total of Rs. 80 lakhs will be required under this scheme as credit.

Requirements of Key Materials. Improved seed, plant material, propagation equipment, chemicals, and fertilizers, sprinklers, irrigation accessories, etc. :

(i) For Garden Colonies	Rs. 50,00,000
(ii) For development of orchard through the Orchard Development Corporation	Rs. 50,00,000
	<u>Total Rs. 1,00,00,000</u>

4. ESTABLISHMENT OF PROGENY ORCHARDS-CUM-NURSERIES

Objectives. This is a continuation of the Third Plan scheme. The scheme was put into operation only in Third Plan with a view to create self-sufficiency in fruit nursery stocks of reliable parentage and genuine quality for supply to the fruit growers. The aim was roughly to establish a 20 acre progeny orchard-cum-nursery in each district town, the over-all requirement being established at 200 to cover 300 districts, with three subsidiary nurseries in tehsil towns taking on the average four tehsils per district. It was also proposed to establish an additional six acre progeny orchard for choice seedling mangoes in each of six States, viz., West Bengal, Bihar, Andhra Pradesh, Punjab, Uttar Pradesh and Madhya Pradesh.

Resume of Work so far Done. Against an original target of 24 progeny orchards cum-nurseries in the Third Plan provision in different States was made for 9, of which 28 have actually been started so far. Since the scheme has been started in the Third Plan only, efforts are being made to step up the tempo of progress with a view to achieve the physical targets.

Facilities Offered. For the establishment of each progeny orchard, staff provision has been made.

Projections for the Fourth and Fifth Plans. It has been decided to continue this scheme in the Fourth and Fifth Plans also. In the Fourth Plan it is proposed to start additional 72 progeny orchards along with 2.6 subsidiary nurseries thus bringing into existence a total of 100 progeny orchards by the end of Fourth Plan.

5. FINANCIAL ASSISTANCE TO PRIVATE AND COOPERATIVE ORGANISATIONS SUCH AS AGRI-HORTICULTURAL SOCIETIES AND OTHERS TO PROMOTE HORTICULTURE

Outline. Financial assistance in the form of grants will be offered to private organisations like Agri-Horticultural Societies, commercial nurserymen, seed growers, cooperative vegetable or fruit development federations or boards, municipal committees/corporations, district boards and others, who come forward to promote the development of fruits, vegetables and ornamental plants and to raise genuine and true-to-type seeds and bulbs of plants for supply to the public.

Objectives. As development of horticultural crops is a long term investment requiring a large outlay, this scheme contemplates the provision of financial assistance in the form of grants to private organisations who cannot afford to incur expenditure on many of the permanent structures and other day-to-day essential activities. The scheme also aims at ensuring the production and distribution of good quality vegetable seeds and bulbs of ornamental plants for supply to the public.

The Need for the Scheme. Most private organisations like Co-operative Fruit and Vegetable Development Boards, Agri-Horticultural Societies, commercial nurseries, district boards, municipal committees/corporations are interested in the development of horticultural crops, but lack sufficient financial resources. In order that they may be in a position to play their role better and in a more effective manner, it is felt that these organisations should be given financial assistance in the form of grants. It is felt that many of the seeds and bulbs of ornamental plants and vegetables sold by nurserymen in the market are not true-to type and the plant material raised from them is inferior to the varieties advertised by the nurserymen. Steps will be taken by the Government to ensure supply of such material, duly certified, to the public at reasonable rates. A suitable technical service will be rendered by the Government of India to help the commercial nurserymen and seed growers to implement this object.

Critical Review of the Progress of the Third Plan Scheme and the Position likely to be reached by the end of the Third Plan

The scheme for grant-in-aid to Agri-Horticultural Societies in India has been kept as a Central Category 'A' Scheme in the Third Five Year Plan with a total provision of Rs. 4 lakh. The break-up provision for each year of the Third Plan is indicated below.

Year	Original	Revised estimates asked for
1961-62	75,000	50,000
1962-63	75,000	40,000
1963-64	75,000	40,000
1964-65	75,000	40,000
1965-66	1,00,000	
	4,00,000	

So far nine Agri-Horticultural Societies have taken advantage of the loans offered under this scheme.

Projections for the Fourth and Fifth Plans. It is proposed to continue the scheme during the Fourth and Fifth Plan periods. The new scheme aims at giving financial assistance not only to Agri-Horticultural Societies but also to other private organisations, like commercial nurseries, cooperative vegetable or fruit development federations or boards, municipal committees/corporations, district boards and such other private organisations who come forward to promote horticulture.

Advance Action to be taken in the Third Plan. The scheme will be circulated to different States and will be given due publicity in local papers. Applications will be invited at the end of the Third Plan so that the work of the scheme can be commenced from the beginning of the Fourth Plan without any loss of time. All the formalities will be completed by the end of the Third Five Year Plan.

Facilities Offered under the Scheme. Applications will be invited every year through the State Directors of Agriculture from the private organisations listed above for giving financial assistance to them for different purposes. The applications will be scrutinised by the Indian Council of Agricultural Research. If necessary, an officer of the Council will visit the premises of the organisations to assess the financial assistance required. He will submit his report to the Indian Council of Agricultural Research and the final decision in this regard will rest with the Vice-President of the Council.

The extent of grants to be offered for different purposes for each of the organisations under this scheme will be as indicated below :

(a) NON-RECURRING

(i)	Cactus House	5,000
(ii)	Tropical Plant Propagation House	10,000
(iii)	Buildings for Library and Seed Store	20,000
(iv)	Introduction of plants of new varieties from within the country	5,000
(v)	Setting up of green or glass house	5,000
(vi)	Seed Storage, Grading & Packing Equipment	5,000
		<u>50,000</u>

(b) RECURRING

	Per year	For five years
(i)	For arranging horticultural exhibitions	3,000 15,000
(ii)	For publishing horticultural literature	2,000 10,000
(iii)	For providing Central staff to the organisation	4,000 20,000
	<u>9,000</u>	<u>45,000</u>

Financial assistance will also be offered to the Agri-Horticultural Societies or private agencies for establishment of nurseries, procurement and distribution of vegetable seeds, fertilizers, insecticides, fungicides and plant protection equipment for popularising kitchen gardens in the cities. An *ad hoc* provision of Rs. 2 lakhs has been made during the Fourth Plan period for this purpose. The private commercial nurserymen and seed growers will be registered by the Indian Council of Agricultural Research for raising genuine and true-to-type seeds and bulbs of ornamental plants for supply to the public. The seeds and bulbs will be raised under the supervision of the staff provided by the Government of India free of charge to nurserymen registered for the purpose. The stock of seeds and bulbs will be sealed in packets giving full description of the material and certified by the inspectorate staff provided by the Government of India for this purpose. Each centre, where the staff will be provided, will consist of four or five nurseries.

Staff Pattern. The scheme will run under the Indian Council of Agricultural Research with the existing technical officers.

Technical staff consisting of one Horticultural Assistant, one or two *malis* will be provided by the Government of India at their cost to each of the organisations. Retired Government servants will be eligible to be employed for this work with Agri-Horticultural Socie-

ties. They will be paid by the Government of India under this scheme. The overall control of the scheme will remain with the Indian Council of Agricultural Research with the coordination of the State Directors of Agriculture or the State-Horticulturist/Fruit Specialist. It will be treated as a Category 'A' Scheme.

Duration of the Scheme. The scheme will function during the Fourth and Fifth Plan periods.

Practical Utility of the Scheme. The scheme will help in the stepping up of horticultural development programmes in different States through private bodies.

Supervision of the Scheme. The scheme will be under the overall charge of the State Director of Agriculture or Horticulture. The technical coordination will be done by the Indian Council of Agricultural Research.

Financial Implications. About 25 to 30 organisations are likely to take advantage of this scheme in the Fourth Plan for different purposes. A total sum of Rs. 15,00,000 may be provided for giving grants to different private organisations during this period.

Foreign Exchange Requirements. No foreign exchange is necessary under this scheme.

Credit Required. No credit facilities are required under this scheme.

Requirements of Key Materials. The responsibility for procurement of key materials like plants, seeds, implements, fertilizers, etc., will lie with the private organisations to whom financial assistance will be given.

6. SCHEME FOR THE DEVELOPMENT OF COCOA

Outline

Objectives. The scheme aims at developing in the Fourth Plan 1,600 acres under Criollo cocoa in the States of Madras, Kerala Mysore and Maharashtra and an area of 1,500 acres under Forestero cocoa in the States of Orissa, Assam, Tripura and Andamans and Nicobar Islands.

The Need for the Scheme. The consumption of cocoa products in India by the end of the Fifth Plan is likely to be around 2,000 to 2,500 tonnes, the import of raw material for which would cost from Rs. 50 to 65 lakh every year. An ascertained, export market exists for the

beans to the extent of 5,000 tonnes. The scheme envisages to expand the cultivation of cocoa to meet both these markets.

Critical Review of the Progress of the Third Plan Scheme and Position likely to be reached by the end of the Third Plan

Under experimental plantings of Forestero in an I.C.A.R. scheme, the States of Assam, Orissa and Tripura accepted the target area of 625 acres. Under the Plan, planting of 2,000 acres under Criollo was allotted to the Kerala State while Madras and Mysore States were to undertake pilot planting only. An area of 75 acres under Forestero has been covered so far and another 50 acres is expected to be covered in the current planting season. Even if enough seeds are arranged to be imported in the current Plan period, because of the time lag between sowing them and planting the seedlings raised therefrom, the target may not be achieved fully. Moreover, not all the State Governments have formally sanctioned the scheme yet and placed the staff in position. The scheme for extended planting of Criollo in Kerala State was sanctioned duly but the State Govt. took time to arrive at a decision as to which variety they wanted to plant. They have now accepted to cultivate the Criollo but will have the benefit of only two planting seasons during 1964 and 1965. Further, in view of the present inadequate seed resources, there is likely to be a shortfall in achieving the target. The actual gap is difficult to estimate as several factors are involved not excluding the degree of sustained drive which the State would bring to bear upon the operation of this scheme.

Projections for the Fourth and Fifth Plans. By the end of the Fifth Plan an area of 6,000 acres under Forestero may require to be developed to meet partly the anticipated internal demands. A field study of progress made so far of the I.C.A.R. scheme for experimental cultivation of the Forestero has brought to light certain serious drawbacks which stress the need for a cautious approach in the matter. In Orissa, the conditions appear to be more or less suitable for a steady extension of area under this type. In the States of Tripura and Assam, however, there are certain climatic vicissitudes in the locations earmarked by the State officials apart from their inaccessibility and poor transport facilities. A marked dry period during which facilities resorting to irrigation of the crop do not appear to be available. The minimum temperatures are reported to go below 50°F which is the critical limit for cocoa. Tripura has also another limitation in that the available lands are too impoverished to support cocoa though it may be possible to select suitable sites if an extensive survey of the area is made. It is further noted that the State Government of

Assam is yet to sanction the scheme formally thus leaving only one planting season on hand for active operations. Hence, a realistic approach seems to be called for in fixing the target. Though the demand for Criollo bean in world market is quite appreciable, the planning to be realistic envisages a production of only 1,250 tonnes at the end of the Fifth Plan. The above limited target is envisaged due to inadequacy of seed supplies for which sole dependency on local resources has to be necessarily placed.

The phasing, thus, will be as follows for the two varieties :—

	Production Estimates at the end of Fifth Plan (Tonnes)	Area required to produce (acres)	(Targets)		
			Third Five Year Plan (acres)	Fourth Five Year Plan (acres)	Fifth Five Year Plan (acres)
Forestero to supply internal markets :	1,500	6,000	400	1,500	4,100
Criollo for placing in export markets :	1,250	5,000	600	1,600	2,800

Advance Action to be taken in the Third Plan. It is proposed to run a 15-day training course during 1964-65 at the Cocoa Experimental Stations in Madras State to the staff proposed to be employed on the Cocoa Development Scheme in the different States with the co-operation of the Madras State Government. The States shall have to select the sites for the cocoa nurseries and finalise all arrangements connected with selection of parent trees and procuring seed material.

Facilities Offered under the Scheme. The State staff will be offered technical guidance on all aspects of cocoa cultivation by the I.C.A.R. on request through the Cocoa Development Officer specially employed under the scheme. The staff in turn, will help growers in the selection of sites, technique of crop production, curing of the raw beans and marketing. The States will arrange to collect and assemble the seed material in each season and supply 'elite' planting material to the growers at fixed rates. Medium-term loans will be advanced to the extent of Rs. 150 per acre, in part as seedling material for planting seed and plant material of shade plants, equipment like spray accessories, fermentation boxes, trays, etc., have to be stocked in each State at convenient and accessible centres for supply to the growers.

Staff Pattern

FINANCIAL OUTLAY : The pattern of staff proposed is given below with very rough financial outlay against the different items for the Fourth Plan. The financial estimates are intended merely to give a broad outline of the provisions that might have to be made and are not intended to be taken at this stage as figures for adoption in the Fourth Plan.

KERALA

One officer, one assistant, two fieldmen, one clerk and one peon.

Expenditure on staff :	Rs. 77,000
Contingencies (including nursery costs) :	Rs. 24,500
Loans :	Rs. 75,000

MADRAS

One officer, one assistant, two fieldmen, one clerk and one peon.

Expenditure on staff :	Rs. 88,000
Contingencies (including nursery costs) :	Rs. 29,000
Loans :	Rs. 90,000

MYSORE

One officer, two fieldmen one clerk and one peon.

Expenditure on staff	Rs. 41,000
Contingencies (including nursery costs) :	Rs. 21,300
Loans :	Rs. 45,000

MAHARASHTRA

One officer, one clerk and one peon.

Expenditure on staff :	Rs. 36,000
Contingencies (including nursery costs) :	Rs. 11,000
Loans :	Rs. 30,000

TRIPURA

One officer, one clerk and one watchman.

Expenditure on staff :	Rs. 41,000
Contingencies (including nursery costs) :	Rs. 16,000
Loans :	Rs. 37,500

ASSAM

One officer, one clerk and one peon.

Expenditure on staff :	Rs. 34,000
Contingencies (including nursery costs) :	Rs. 19,000
Loans :	Rs. 45,000

ORISSA

One ranger, two foresters, four *malies* and two guards.

Expenditure on staff :	Rs. 57,000
Contingencies (including nursery costs) :	Rs. 57,000
Loans :	Rs. 1,50,000

ANDAMANS AND NICOBAR

One forester and one guard.

Expenditure on staff :	Rs. 15,000
Contingencies (including nursery costs) :	Rs. 3,000
Loans :	Rs. 7,500

Yard-stick for Arriving at the Expenditure

- (a) The seed requirement for one acre is taken at 2 lb. and the price @ Rs. 2 for Criollo/lb. and Rs. 8/lb. for Forestero. An extra amount has been added to meet incidentals.
- (b) The staff structure is on the basis indicated by the States for the Third Five Year Plan.
- (c) The nursery costs are based on the cost of raising one plant at a little above 20 Paise each, adding an extra amount for unforeseen expenditure.
- (d) Non-recurring expenditure has been provided for States which did not get any such help in the Third Five Year Plan and based on the need for additional construction.
- (e) Loans are to meet only part of the expenditure and is taken at Rs. 150 per acre.

Overall Financial Implications. The scheme involves roughly an outlay of Rs. 10.69 lakhs as shown under :

Recurring :	5,49,500
Non-recurring :	20,000
Loans :	4,80,000
	10,69,500
or	10.69 lakhs

Foreign Exchange Requirements. An amount of Rs. 22,000 to cover for import of 2,700 lb. of Forestero (to be paid in Malayan dollars) may be required.

Credit Required. The amount required by the States shall have to be advanced to the States as loans totalling Rs. 4,80,000.

7. CERTIFICATION, INSPECTION AND REGISTRATION OF VIRUS-FREE TREES

Objectives. It is a new scheme proposed to be launched in the Fourth Plan.

It is well recognised that the success of commercial orcharding depends upon the health, longevity and economic bearing of the orchard trees. It is now known that the degeneration of clonal materials takes place if the established plants suffer from viruses. In India, the citrus decline in Maharashtra and Andhra Pradesh has been diagnosed as due to viruses like Tristeza, Psorosis and Xyloporosis. In the Abohar area of the Punjab, young newly-established orchards have shown symptoms of the type of decline that has been traced to viruses eventually. It is, therefore, of prime importance to isolate and maintain healthy and virus-free bud material for propagation purposes and dissemination of certified disease-free stocks to the growers. This aspect has been stressed in an important major recommendation made at the Fourth Horticultural Research Workers Conference held at Poona in May, 1961.

It is, therefore, proposed to initiate a bud indexing or variety improvement programme for building up virus-free foundation stocks.

Resume of Work so Far Done. No such work has been done so far in India and neither is there any agency to carry out this work.

Work Proposed to be Undertaken. Under this scheme, it is proposed to start work on citrus at the following centres :

1. For Mosambi orange at the IARI Virus Research Centre, Poona, Maharashtra.
2. For Sathgudi orange as an annexe at the Regional Fruit Research Station, Anantharajupet, Andhra Pradesh.
3. For Malta orange as an annexe at the Regional Fruit Research Station, Abohar, Punjab.

The scheme will work in close collaboration with commercial fruit nurseries in the particular region where bud indexing programmes on suitable differentials is to be taken up, so that only trees free from viruses are utilised for further propagation. To begin with, the work of indexing may first be started at the Government nurseries and the virus-free bud material maintained, at new isolated areas where old plantations do not exist.

Facilities Required. About ten acres of land will be required for each centre as an annexe to undertake this programme.

Advance Action Necessary in the Third Plan. The Sub-Committee of the Working Party on Horticulture while examining this programme suggested that the scheme may be taken up on a pilot project basis before it is launched as a developmental project. A separate scheme on pilot project basis will be submitted to the ICAR Pilot Project Committee so that before the scheme is launched during the Fourth Plan, sufficient data would be available on certain aspects of this programme.

Financial Implications for Fourth Plan. For each of the above centres, the following staff is proposed :

1. One Senior Virus Pathologist Class I
2. One Asst. Virus Pathologist (Vectors) Class II
3. Four Pathological Assistants for indexing work
4. Four fieldmen
5. One Steno-typist
6. One Attender
7. Two *Malies*
8. One Clerk-cum-Storekeeper (UDC)

The total estimated layout for each centre in the Fourth Plan will be about Rs. 4.50 lakhs (Rs. 3 lakhs for recurring plus Rs. 1.50 lakhs for non-recurring). The grand total for the entire scheme of three centres works out to about Rs. 13.50 lakhs.

Supervision of the Scheme. It will be a non-pattern scheme and the expenditure on this scheme if accepted by the States will have to be borne by the State Governments concerned from State Plan ceilings. The technical guidance will, however, remain with the Centre.

8. SCHEME TO EVOLVE MATURITY STANDARDS OF FRUITS IN RELATION TO PACKING AND REFRIGERATED TRANSPORT

Objectives. This is a new scheme proposed to be launched in the Fourth Plan.

To carry out systematic physical and chemical investigations of the changes that take place in fruits during development to ascertain proper maturity ensuring proper ripening with a view to be able to evolve suitable maturity indices. These investigations are of considerable importance for proper development of Horticultural Industry in India particularly to meet export specifications and ensure profitable processing and marketing. The harvesting of fruits on correct maturity will help in reducing the spoilage due to under maturity and helping long distance transport by avoiding over maturity. Maturity standards will also be of great help to formulate grade standards which mainly are based on physical characteristics after harvest, whereas maturity standards will be based on both physical and chemical characteristics in relation to proper post-harvest physiological behaviour.

Resume of Work So Far Done. Research on evolving maturity standards has not so far been conducted systematically except preliminary work done at C.F.T.R.I. with respect to only a few commercial fruits. It is desirable that detailed work should be carried out so that definite maturity standards will be laid down for commercial fruits so as to ensure standards so that it can help in proper utilisation of the fruits for marketing and processing.

Practical Utility. Harvesting at proper maturity helps in successful transportation and marketing of the fruits. Proper maturity also will ensure better product after processing, particularly for export purposes where quality has to be maintained. It would be essential that the fruits must be harvested at the correct maturity so as to stand transportation and give suitable post-transportation life for marketing in foreign countries. The fruit harvested at proper stage of maturity also will be resistant to spoilage to some extent.

Projections for the Fourth Plan. In the Fourth Plan, it is proposed to work out maturity standards for commercial fruits like mango, banana, citrus fruits, grape, sapota, pineapple, guava and litchi which have immediate export value. Besides, maturity standards of other commercial fruits will also be worked out. In view of the variety of fruits involved, it is proposed that the work should be conducted at a number of laboratory centres in the country. It is proposed that a group of workers working on particular variety at one place may be

transferred to another place for some other variety of fruit growing in different season.

Thus, in total about 10 laboratories would be needed directly working under C.F.T.R.I.

Financial Implications. The staff requirement for each laboratory centre will be as follows :

1. One Plant Physiologist
2. Two Junior Scientific Assistants
3. Two Field Assistants
4. One Typist-cum-Clerk

In addition, the project will be coordinated by a group of workers at C.F.T.R.I. which will constitute the following :

1. One S.S.O. (II)
2. Two Senior or Junior Scientific Assistants
3. One Artist
4. One Field Assistant
5. One U.D.C.

The total outlay for 10 laboratory centres with coordination at C.F.T.R.I. would amount to Rs. 15,00,000 (15 lakhs rounded).

Foreign Exchange. Nil.

Supervision of the Scheme. The scheme may run under C.F.T.R.I. who have already carried out the initial work and can have further assistance of laboratories through their regional centres which will in turn reduce overhead costs and make the scheme economical. The funds for this scheme will be allotted to the Director, C.F.T.R.I., Mysore, where the work relating to the refrigerator transport of different varieties concerned will be carried out as a part of their normal routine and slight assistance given for doing the work on evolving maturity standards.

9. ESTABLISHMENT OF NEW PLANT INTRODUCTION UNITS AND DEVELOPMENT OF NATIONAL HORTORIA

Plant introduction is an important method for quickly effecting plant improvement. In view of its importance the unit for plant introduction work at the Indian Agricultural Research Institute was expanded and placed on a permanent basis during the Second Five Year Plan. Subsequently, under the Third Plan this has been developed into a full-fledged Division of the Institute for the systematic

introduction of plant materials from all parts of the world particularly of agricultural and horticultural significance, under quarantine control and for the assessment, utilisation and maintenance of such materials. The Division has four experimental regional sub-stations out of which two, one at Simla and the other at Amravati, are already functioning. The remaining two, viz., in Rajasthan and in the South, are in the process of being set up.

For the introduction and preservation of classified and named useful genetic stocks of horticultural plants—fruits, vegetables and ornamentals, both foreign and local, the Indian Council of Agricultural Research set up three National Hortoria, at Hassarghatta (Mysore), Mashobra (Himachal Pradesh) and Meerut (U.P.), as category A scheme under the Third Plan.

Plant Introduction Organisation in the Fourth Plan. Proposals for the continuance of the Third Plan scheme relating to Division of Plant Introduction with additional facilities during the Fourth Plan have already been prepared for consideration of the Working Group on Agricultural Research.

In view of the increasing demand for genetic stock of horticultural plants in particular and considering the need for covering major agro-climatic regions for plant introduction work in general it is felt that the desired objectives can be achieved more fully and expeditiously if the existing units, viz., the Plant Introduction Stations and National Hortoria are brought together and provided with additional facilities and also a provision is made for more plant introduction units to be established in important agro-climatic regions not covered at present.

National Hortoria. The three National Hortoria were set up with the object of maintaining useful genetic stocks of horticultural plants, both introduced and indigenous. The Division of Plant Introduction at Indian Agricultural Research Institute is, however, mainly responsible for the introduction of agricultural and horticultural plant materials and for their assessment and maintenance at the appropriate regional stations. The Plant Introduction Stations and the Hortoria have the same purpose in the first phase of the work, viz., collection and screening of the genetic stocks for determination of synonymy and genetic potential. In the later phases of the work the Hortoria would, however, maintain the classified and named stocks of the horticultural plants and also arrange for the supply of authentic propagation material to research workers at the various Horticultural Experiment Stations.

Since for the import of plant material of agricultural and horticultural plants the Division of Plant Introduction is the main authorised agency, the Hortoria can function more effectively as an integral part of this Division for administrative and technical purposes. Moreover, from the plant quarantine point of view also such an arrangement is in the national interest.

Additional Plant Introduction Units. On a phytogeographical basis, and considering the significant variations in latitude, altitude, rainfall distribution and other related factors influencing plant growth and distribution in India, it is obvious that we must recognise the distinct major agro-climatic regions which could develop a new potential as a result of carefully planned and executed plant introduction programme. The present sub stations are not considered adequate to cover the important climatic regions. Thus, there is ample justification for adding at least three more units for adequate coverage. The regions which are at present not covered include the South Indian hills, high rainfall west coast and the east coast zone comprising parts of Andhra Pradesh and Orissa.

Facilities Required and the Financial Estimates

A. ADDITIONAL PLANT INTRODUCTION UNITS : The following would be the requirements in respect of each of the three additional sub-stations proposed to be set up under the Fourth Plan.

Staff

One Horticulturist (Junior Class I), One Assistant Botanist (Class II), One Research Assistant (Class III), One Typist-clerk and the supporting Class IV field staff

Land and buildings

	Rs.
10-acre land	40,000
Buildings, laboratory fittings and farm fencing	60,000
Equipment (including air conditions for the seed store)	15,000

Contingencies

10,000

T. A.

2,000

N.B. It is likely that for irrigation water, a well may have to be sunk or excavated at these stations. Each well would cost about Rs. 8,000 to Rs. 10,000.

B. NATIONAL HORTORIA : The three Hortoria are under Category A scheme of the I.C.A.R. and these may be continued as committed expenditure under the Fourth Plan. It hardly needs emphasis

that the Hortoria have to be continued as a long-term project. To make proper use of the land, buildings and other facilities already provided at the Hortoria and to satisfactorily carry out the technical work envisaged for the Hortoria the following additional facilities are required to be made available at each Hortorium.

Staff

One Horticulturist (Junior Class I)

At Hassarghatta, at present there is only one Research Assistant, whereas at other two Hortoria there are two each. In fact taking into consideration the distinctive Hassarghatta climate which would be favourable for the study and maintenance of a wide variety of Horticultural plants more staff is needed. Therefore, it is proposed to provide two more Research Assistants here.

Equipment. A medium-sized glass house costing about Rs. 25,000.

Total Funds for the Fourth Plan Period : 13,58,400

Financial Statement (for five years)

A. NEW SUB-STATIONS :

At each of the three new sub-stations *(for three units)*

<i>Recurring :</i>	<i>(Rs.)</i>	
Pay and allowances of the staff	1,92,400 × 3	5,77,200
Contingencies	50,000 × 3	1,50,000
T.A.	10,000 × 3	30,000
	Total	7,57,200
 <i>Non-recurring :</i>		
Cost of land (10 acres)	40,000	
Buildings	60,000	
Irrigation (Well)	10,000	
Equipment	15,000	
	Total	1,25,000 × 3 3,75,000

B. NATIONAL HORTORIA :

<i>Recurring :</i>		
Pay and allowances of the staff	1,36,200	
<i>Non-recurring :</i>		
Glass Houses	75,000	
Equipment	15,000	
	Total	50,000
	Recurring	8,93,400
	Non-recurring	4,65,000
	GRAND TOTAL	13,58,400

10. POTATO SEED DEVELOPMENT SCHEME

Objectives. This is a new scheme which aims at the development primarily of seed potato areas in the hills of Himachal Pradesh, Punjab, U.P., Jammu and Kashmir and Madras State and in the plains of the Punjab, U.P., Bihar and Rajasthan which are best suited for the production of disease-free seed potatoes, duly certified by seed certification agencies.

The Need for the Scheme. The potato has gained sufficient importance in the agricultural economy of the country during the recent years. The existing area under potato crop is estimated to be 3.64 lakh hectares and it is expected to increase to 5.2 lakh hectares during the Fourth Plan. Although, there has been progressive increase in the area under this crop, the increase in yield has not been correspondingly appreciable. The present production level of nearly 75 quintals per hectare is low and this is attributed largely to the use of diseased seed. It is considered possible to double the yield by the use of healthy seed tubers, because the application of artificial fertilizers and adoption of other good cultivation techniques result in maximisation of yield only when the seed is of high quality.

Fortunately the climatic conditions in the hills especially in situations above 7,000 ft. altitudes are particularly suitable for the production of disease-free stocks of seed potatoes which can be further multiplied for one or two generations in the plains of North India during winter and spring months. At present our seed sources are only partially developed except in Himachal Pradesh, but there too the proper facilities for certification are lacking. Seed potatoes are being imported from Sikkim, Nepal and Burma for use in North India and from the United Kingdom in Madras at considerable expenditure of foreign exchange. It is, therefore, considered necessary to develop the internal sources of seed potatoes and put an end to the costly imports. About 13,600 hectares on the hills and about 6 lakh hectares in the plains have to be developed to meet our seed requirements.

The rate of seed multiplication in potatoes is only four to five in the hills and five to ten times in the plains. Fifteen to twenty maunds of seed tubers are required to plant an acre. To check the spread of virus diseases which cause quick decline in seed stocks, rigorous roguing and control of aphids which spread the disease has to be done effectively.

The problems of storage and marketing are acute because the quantities involved are large. Suitable technical guidance and adequate quantities of nucleus and foundation seed stocks at reasonable

rates have to be provided to the growers for multiplying registered and certified seed stocks. Credit facilities have to be made available to facilitate regular replacement of seed and the adoption of plant protection measures, free field inspection and award of certification tags are the other incentives to be included under the envisaged scheme.

**Critical Review of the Third Plan Scheme and Position likely to be reached
by the end of Third Plan**

Development of potatoes was not taken up in the national plan although *ad hoc* schemes have been operating in the Himachal Pradesh, Punjab and Uttar Pradesh on a limited scale. The potato areas on the hills are estimated to be as under :

	<i>Hectares</i>
Himachal Pradesh	6 000
Punjab	2,000
Uttar Pradesh	2,800
Jammu & Kashmir	800
Madras	2,000

On the basis of this targeted area to be taken up for development, the requirements for different classes of seed are fixed as follows :

Area Requirement for different classes of seed

<i>Hills</i>	<i>Early varieties (Hectares)</i>	<i>Late varieties (Hectares)</i>	<i>Nilgiris (Hectares)</i>	<i>Total (Hectares)</i>
Nucleus	68	26	13	107
Foundation	340	130	64	534
Registered	1700	650	320	2670
Certified (H)	8500	—	1600	10100
<i>Plains</i>				
Certified (PI)	34000	3250	—	37250
Certified (PII)	—	32500	—	32500

Seed available for general sowing :

<i>Hectares</i>	
1,70,000	Early varieties
3,25,000	Late varieties
8,000	Nilgiris varieties
5,03,000	Total

The Central Potato Research Institute is in a position to supply annually about 1650 quintals of nucleus seeds of different commercial varieties, which will be further multiplied in desired quantities of nucleus and foundation stage at Government farms by the different States. *Advance action is, therefore, to be recommended to the State Government concerned to start nucleus and foundation farms during the Third Plan to be able to multiply the desired quantities of seed.*

Projections for the Fourth and Fifth Plans. A package programme approach is recommended for the potential seed potato areas. Entire villages may be selected for proper implementation of the programme and to facilitate the work of development and inspection and certification. It is desired to make the approach through the village cooperative societies so that credit for services and supplies is given to each society on the basis of the entire village plan for actual area to be put under seed potatoes and quantities of seed produced contracted against loans and supplies. For providing technical guidance and laying out demonstration trials, Potato Development Officers assisted by other field staff need to be appointed in major potato-growing States. The full impact of the programme will be felt after six or seven years, and the staffing and other requirements are to be suitably phased for the Fourth and Fifth Plans. The entire seed potato areas in hills would be covered during the Fourth Plan, but the saturation of the plains with certified seed will be possible during the Fifth Plan.

THE FACILITIES TO BE PROVIDED INCLUDE :

- | | |
|---|---------------|
| 1. Credit for the supply of seed, fertilizers |) Rs. 1000.00 |
| insecticides, fungicides and plant protection |) per |
| equipment on usual subsidized rates |) hectare |
| 2. Technical guidance, field inspection, |) Free |
| certification tags |) |
| 3. Advances against quantities of seed handed |) @ Rs. 27.00 |
| over to the Cooperative Society |) per quintal |

Demonstration plots where all the recommended practices may be adopted as a package will be laid out in .08 to .16 hectare plots with 500—1000 demonstrations each year. Free seed, fertilizers and insecticides will be provided for such trial.

Low volume power sprayers have been found to be very useful for the effective and quick plant protection measures especially in the hills. One such sprayer is to be provided for 200 hectares in the plains and 400 hectares in the hills for assisting the growers to adopt prompt plant protection measures.

Staffing Pattern. Trained technical staff will be required to give advice and guidance to the growers in raising the healthy disease-free stocks. The staffing pattern may be :

- | | |
|--|----------|
| (i) One Potato Development Officer in Class I
for 10 States for five years | 10 |
| (ii) Regional Potato Development Officer in
Class II, each for 2,000 hectares in the hills
and for 4,000 hectares in the plains
(for 3 years) | 21 |
| (iii) Two Agricultural Inspectors, 4 Sub-Inspectors,
8 <i>beldars</i> for each region (for 3 years) | 21 units |

One pick-up van is recommended for each State and one power sprayer per 200 hectares in the hills and 400 hectares in the plains has also been provided.

Seed Certification. Field inspection surveys to check the standards of purity and freedom from virus diseases will be required for certified seed production. In the hills one Inspector should be able to inspect 200 hectares whereas in the plains 400 hectares in a season. Separate seeds certification staff required for the purpose has been included in the improved seed programme of all crops. (Working Group on Improved Seeds).

Marketing. Apex cooperative organisation like the Cooperative Potato Development and Marketing Federation of Himachal Pradesh may handle certified seed in each State. The procurement, grading, bagging and handling may be organised through the member village cooperatives. Loans for seed, fertilizers and insecticides will be disbursed through the cooperatives and necessary funds for making advance payments for seed potatoes in the hills may be placed at their disposal in the form of *revolving fund*. Loans could also be advanced to the growers in advance for crop production out of the *revolving fund*.

Programme Implementation and Coordination. The C.P.R.I., several State Departments of Agriculture and growers will be required to cooperate in this programme. It is, therefore, considered desirable that technical staff may be provided in the centre so that the development programme is properly implemented. One Chief Potato Development Officer assisted by a small nucleus staff may be provided to organise and coordinate the potato seed development work.

Financial Implications

STATE PART

Recurring :

	Rs.
(i) Ten Potato Development Officers	3,00,000.00
(ii) Twenty-one Regional Potato Dev. Officers	2,64,000.00
(iii) Agricultural Inspectors, Sub-Inspectors, <i>beldars</i> for 21 regions	11,34,000.00
(iv) Office staff	3,00,000.00
(v) T.A.	1,00,000.00
(vi) Contingencies	5,00,000.00

Non-Recurring :

10 Pick-up vans, Rs. 1,50,000	}	3,60,000.00
210 Power sprayers, Rs. 2,10,000		
		29,80,000.00

CENTRAL PART

(1) One Chief Potato Development Officer at Rs. 1,200	72,000.00
(2) Two Technical Assistants (Selection grade) and one Stenographer	60,000.00

Total	1,32,000.00
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Grand total	31,12,000*
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Credit Facilities, Revolving Fund

For advance payment of seed in the Hills at Rs. 27 per quintal for nearly 12,000 hectares at 70 per hectare (also for crop loans)	2,25,00,000
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Crop Loans (Short-term)

Crop loans in the Plains for seed crops (60,000 hectares)	6,00,00,000
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Total	8,25,00,000*
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Grand total	8,56,12,000*
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Foreign Exchange Requirements. For the import of 210 low volume power sprayers Rs. 2,10,000 worth foreign exchange will be needed.

Credit Required. The amount required by the States for giving short-term loans and for creating revolving fund with the State Apex Cooperative Societies, totalling Rs. 8,25 00,00 0.

Additional Production. The use of diseases-free seed will result in an additional production of 2.5 tons per hectare and will help in diverting additional 80,000 hectares to potato crop resulting in 8 lakh tons additional production.

11. DEVELOPMENT OF VEGETABLE PRODUCTION

Objectives. This is in main a continuation of a Third Five Year Plan Scheme for the Development of Vegetable Production by providing technical guidance, good quality seeds, demonstration of desirable agronomic practices and offer of credit facilities especially in areas around newly-developing industrial areas and capital towns and for extension in area of export-purpose crops like onions. It aims now at increasing the production of vegetables by 50 lakh tons by the end of the Fourth Plan. The existing area under vegetable crops including onions is nearly 6.8 lakh hectares with a production of nearly 50 lakh tons.

Need for the Scheme. Our present production and consumption of vegetables is inadequate to meet even the minimum nutritional requirements. It is, therefore, considered necessary to double the production to meet in the first phase of at least 50 per cent of the daily minimum per capita requirements.

Although vegetable production is concentrated in areas around big cities, due to the extension of roads and power supply to the rural areas, vegetable growing has a great potential for diversification of agricultural productions, and development of 'truck farming'. There are many vegetables of commercial importance and their culture is highly specialised. Timely technical advice in vegetable growing on measures such as choice of suitable varieties, crop production for early markets, use of high-quality seeds, judicious manuring and prevention and control of insect pests and diseases is necessary. The supply and multiplication of seeds of improved varieties, demonstrations of optimum cultural practices, provision of irrigation facilities especially in new areas, grading, curing and marketing as envisaged to be provided under this scheme, will go a long way in achieving the objective.

Critical Review of the Progress of the Third Plan Scheme and Position likely to be reached by the end of the Third Plan

Considering the importance of good-quality seeds in relation to vegetable production, a Seed Certification Scheme was started during

the Second Plan and continued in the Third Plan. Under this Scheme seed-testing laboratories were to be set up in all the States and field inspection service created for certification of seeds. It was anticipated that 2.96 lakh hectares would be covered by certified seed by the end of the Third Plan. Due to non-availability of seed-testing equipment in the absence of a seed law, however, the programme has not made much progress in respect of certification of seeds. Nine States and one Central Seed Testing Laboratories are expected to be ready by the end of 1963 and one laboratory in each State will have been set up by the end of Third Plan. Complete sets of equipment are being received from the U.S.A. under an Aid Programme. A Seed Law is also expected to be enacted by 1965.

With a view to providing necessary technical advice and good seed to the growers a scheme for the Development of Vegetable Production was formulated for the Third Plan with a total outlay of Rs. 72 lakhs. This is expected to result in an additional production of 33.23 lakh tons of vegetables. The programme for the Third Plan had been accepted by the States of Assam, Madras, West Bengal, Uttar Pradesh, Punjab, Mysore, Andhra Pradesh, Madhya Pradesh and Rajasthan and Union Territories of Himachal Pradesh and Pondicherry at a cost of Rs. 47 lakhs. The scheme has not made much headway and only Punjab, Rajasthan, Madhya Pradesh and Himachal Pradesh have intimated that they have started the scheme in their own modified way and the States of Mysore and West Bengal intend starting the work during 1963-64.

Projections for the Fourth and Fifth Plans. The Third Plan Scheme for the Development of Vegetable Production is proposed to be launched on a modified pattern during the Fourth Plan for stepping up vegetable production on commercial and kitchen gardening scale in villages by providing technical guidance and laying out field and kitchen garden scale demonstration trials. The demonstration trials will be laid out extensively to acquaint the growers in the use of good quality seed of improved varieties, use of fertilizers and timely plant protection measures, proper grading, curing and storage, etc.

A special drive is aimed at increasing the production of onions (which is an export crop) in the major onion-growing areas of Maharashtra, Andhra Pradesh, Mysore, Gujarat and Madras by providing short-term crop production loans and making available loans for providing curing and storage facilities on cooperative basis.

It is also envisaged to set up vegetable and onion processing units to take care of the surplus vegetables at peak periods of production.

Such units, small and medium, will be set up on a cooperative basis by the growers in the producing centres, especially for dehydrating onions and also in areas specially developed on the production of particular vegetable crops at a distance from the consuming centre.

Medium-term loans for sinking of tubewells, fencing and land improvement near the newly-developing industrial and capital towns, to bring new areas under vegetables, are also required to be provided for 200 units.

The timely and speedy plant protection measures are very important for successful vegetable production. The availability of efficient spraying equipment is essential for quick control of insect pests and diseases. With the extension of vegetable growing, big farms are expected to be set up specialising in vegetable production. Supply of low volume power sprayers which have proved to be very efficient and effective in adopting plant protection measures in vegetable fields shall have to be augmented by import of sufficient number of such units each year till internal manufacturing sources develop.

Foundation seed multiplication farms are required to be set up in the main seed-producing areas to upgrade the quality of seed and to multiply seeds to dry the improved varieties that have become available as a result of several research schemes in different States. The foundation seed stocks will be multiplied by registered growers in adequate quantities under the seed certification scheme and it is envisaged to produce sufficient quantities of certified seeds to cover nearly 2.4 lakh hectares by the end of the Fourth Plan.

Advance Action to be taken during the Third Plan. Being short-duration crops sometimes three to four or even more crops are raised in the same field during the year and as such some of the crops go unrecorded in revenue records for which statistics are collected only twice a year. For proper planning, area and production statistics are vital. Some quick methods of sample survey for estimating area and yield of vegetables need to be taken up immediately to devise a yard-stick.

Being commercial crops, vegetable culture is considered more profitable than field crops. But being perishable in nature the vegetables cannot be retained in the field for an appreciable period after they are ready for harvest. It is usually observed that during peak period of production the prices slump. Moreover, there is a wide gap between the grower's and the consumer's prices which need

to be bridged by starting regulated markets and setting up of collecting, grading, packing and marketing units at production centres and consumer stores in the cities. On the basis of information available for selected cities regarding supply and consumption of vegetables, it is desired that marketing centres and consumers' stores may be organised on Pilot Project basis for one or two selected cities.

The vegetable crops build up huge tonnage within a very short period. With the development programme envisaged, the increased need of fertilizer requirements and plant protection measures are also to be considered. Multiplication of sufficient quantities of nucleus seeds of improved varieties is required for use on the proposed foundation stock. Seed multiplication farms shall have to be planned before-hand.

Facilities Offered under the Scheme

A. TECHNICAL ADVICE : Suitably trained and experienced technical staff headed by a Class I Officer in a State and one graduate Assistant supported by other field staff for each important vegetable growing district is considered essential for providing technical assistance and to lay out demonstration trials. One pick-up van for each State and one low volume power sprayer for each Inspector has also been provided for increasing the efficiency and quantum of work. The facilities for additional staff, pick-up vans, sprayers and funds for laying out demonstration trials will also be made available to the States where vegetable development schemes are already in operation where no such provision was made originally.

Great stress has been laid on laying out field scale and kitchen garden demonstration trials in the villages and village schools by free distribution of seeds, fertilizers and insecticides.

Staffing Pattern

1. One Vegetable Development Officer for each State—for 10 States	10
2. One Agricultural Inspector for each district	200
3. One Accountant, one Steno-typist, one Store-keeper for each State	10 units
4. Two Fieldmen/ <i>beldars</i> / <i>kamdars</i> for each Inspector	400

B. DEMONSTRATION TRIALS : Every Inspector will lay out annually the following trials by supplying free seeds, fertilizers and insecticides.

<i>Field Trials</i>	—	10
Kitchen garden demonstrations in the growers' fields in village schools	}	50—100

C. FACILITIES FOR DEVELOPING NEW VEGETABLE AREAS : Around newly-developing industrial and capital cities short and medium-term loans are provided for 200 tubewells, fencing and land development.

D. FACILITIES FOR WELL-DEVELOPED VEGETABLE-GROWING AREAS : To take care of surplus produce during peak periods of production it is considered necessary to set up storage and processing units under the cooperative societies of the growers. An *ad hoc* provision has been made for providing credit facilities for 10 Processing Units of small and medium size.

E. FACILITIES FOR DEVELOPING PRODUCTION OF EXPORT PURPOSE CROPS LIKE ONIONS : Provision has been made for credit facilities for the construction of curing, grading and packing sheds and suitable storages in the main producing areas by the cooperative societies of growers.

Short-term credit facilities for the supply of good quality seeds and use of fertilizers, insecticides and pesticides for 8000 hectares are also proposed to be given for increasing production potential.

The technical staff mentioned under item 'A' will guide and execute the entire programme mentioned above.

F. SETTING UP FOUNDATION VEGETABLE SEED FARMS : For the multiplication of certified vegetable seeds as envisaged under the seed certification programme, large quantities of foundation seed stocks will be required. Quite a large number of improved varieties of vegetables are now available in the country. Many areas have become important seed-producing areas for specific crops, that is, Kashmir for temperate vegetables; Maharashtra and Gujarat for onion and okra, the Punjab for peas, radish, carrot and turnips; Uttar Pradesh for melons, other cucurbits and cauliflowers; Bihar for cauliflowers, cucurbits and onions; and Andhra Pradesh for melons and chillies. Besides, there are many other suitable areas like Rajasthan, Himachal Pradesh and hilly regions of the Punjab, Uttar Pradesh and West Bengal which could be developed for producing good quality seeds. Hitherto, the quality of seeds was not taken care of, but with the Seed Law coming into force, the quality of the seeds is desired to be improved through a regular system of multiplication. There is a big potential for export of vegetable seeds provided the

quality is improved. The setting up of 8 to 20-hectare seed farms in suitable seed producing areas for the multiplication of sufficient quantities of foundation seed stocks is essential for meeting the internal demand and creating exportable surplus.

20-hectare farms in the main seed-growing States	10
8-hectare farms in the other potential seed-growing areas	5

Staffing Pattern

20-HECTARE FARMS :

Assistant Vegetable Specialist	1
Agricultural Inspectors (One for Agronomy and one for Plant Protection)	2
Store-keeper	1
Typist-clerk	1
<i>chaukidars</i> and <i>kamdars</i>	5

8-HECTARE FARMS :

Assistant Vegetable Specialist	1
Agricultural Inspector	1
Clerk-cum-Storekeeper	1
<i>chakiudars</i> and <i>kamdars</i>	3

Financial Implications

A. Technical Advice

Staff	40,00,000
T.A. and other contingencies	6,00,000
<i>Non-recurring</i>	
16 Pick-up vans and 200 power sprayers	4,40,000
	<hr/> 50,40,000

B. Demonstration Trials

<i>Contingencies</i> — <i>recurring</i>	
Field trial — Rs. 50 each	
Kitchen garden trial — Rs. 5 each	9,00,000

C. New Vegetable Areas

<i>Medium-term loans</i>	
Installation of 200 tubewells	10,00,000

Fencing and land development—Rs. 500 per hectare for 1600 hectares	8,00,000
	<u>18,00,000</u>
<i>D. Well-Developed Areas</i>	
<i>Long-term Loans</i>	
Ten processing and storage units	50,00,000
<i>E. Export-Oriented Development of Production</i>	
<i>Long-term loans</i>	
Curing, grading sheds and storages	10,00,000
	<u>10,00,000</u>
<i>F. Foundation Seed Farms</i>	
Staff	10,00,000
Contingencies @ 2,500 per hectare	6,00,000
<i>Non-recurring</i>	
Land and buildings—Rs. 70,000 for a big and Rs. 40,000 per small farm (5)	9,00,000
	<u>25,00,000</u>
	<u>1,62,40,000</u>

Foreign Exchange Requirements. For the import of 200 tons volume power sprayers, Rs. 2 lakh worth foreign exchange will be needed.

Credit Required. The amount required by States for giving medium and long-term loans will be Rs. 78 lakhs. In addition a round-sum of Rs 20 lakh has been provided for short-term credit to be met outside the Plan provisions to meet the probable needs of growers at Rs. 100 per hectare.

Additional Production. As a result of technical advice, use of good quality seeds, fertilizers and adoption of protection measures and increase in area under vegetable crops, the additional production by the end of Fourth Plan will be 50 lakh tons.