

**ESTIMATES COMMITTEE
1964-65**

**SEVENTY-NINTH REPORT
(THIRD LOK SABHA)**

**MINISTRY OF FOOD AND AGRICULTURE
(Department of Agriculture)**

**CENTRAL POTATO RESEARCH INSTITUTE
SIMLA.**



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C O R R I G E N D A

To

Seventy-Ninth Report (Third Lok Sabha) on
the Ministry of Food and Agriculture
(Department of Agriculture) -- Central
Potato Research Institute, Simla.

Page 6, para 9, line 8, delete 'other'.

Page 16, para 21, line 4, for '(v)' read '(iv)'.

Page 16, para 23, line 14, for 'root scl' read
'root eel'.

Page 16, para 24, line 3, for 'Alphids' read
'Aphids'.

Page 17, para 27, line 3, for 'exoite' read
'exotic'.

Page 19, line 16, for 'brownret' read 'brown rot'.

Page 21, para 33, line 18, for 'State' read
'States'.

Page 36, S.No. 2, line 2, for 'nourshing' read
'nourishing'.

Page 37, S. No. 6, line 11, for 'proper' read
'produced'.

Page 40, S. No. 16, line 3, for 'invte' read
'invite'.

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(1964-65)

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INTRODUCTION

I, the Chairman, Estimates Committee having been authorised by the Committee to submit the Report on their behalf, present this Seventy-Ninth Report on the Ministry of Food and Agriculture (Department of Agriculture)—Central Potato Research Institute, Simla.

2. It would be recalled that 11 years back, the Estimates Committee (1953-54) had examined the estimates of the Ministry of Food and Agriculture and presented the Seventh Report (May, 1954) which *inter alia* dealt with the Central Potato Research Institute, Patna. Action taken by Government on the recommendations contained in the above Report was examined by the Estimates Committee (1956-57) who presented the Fifty-Third Report on the subject.

3. The Committee took evidence of the representatives of the Ministry of Food and Agriculture (Department of Agriculture) on the 5th December, 1964. The Committee wish to express their thanks to the Special Secretary, Ministry of Food and Agriculture (Department of Agriculture), Director, Central Potato Research Institute, Simla and other officers of the Ministry for placing before them the material and information they wanted in connection with the examination of the estimates.

4. The Report was considered and adopted by the Committee on the 26th February, 1965.

5. A statement showing the analysis of the recommendations contained in this Report is also appended to the Report (Appendix VII).

NEW DELHI;
March 19, 1965.
Phalgun 28, 1886 (Saka).

ARUN CHANDRA GUHA,
Chairman,
Estimates Committee.

CHAPTER I

INTRODUCTORY

A. Introduction of Potato in India

The potato, a native of South America, has been under cultivation in that continent for over a thousand years. In Europe, interest in potato cultivation started with its introduction towards the end of the 16th century. In India, the potato has been regularly cultivated since its first introduction in the country in the early part of the 17th century.

B. Setting up of Central Potato Research Institute

2. Systematic attempts to improve the potato crop were initiated only in 1933 when a scheme (financed by the Indian Council of Agricultural Research) was started at the Nilgiris in Madras State. Two years later, this scheme was replaced by a more comprehensive potato breeding programme at Simla under a scheme of the Indian Agricultural Research Institute, New Delhi. With a view to supplement the work carried out at Simla, an additional sub-station was opened at Bhowali in the Kumaon Hills in 1943. About the same time the Indian Agricultural Research Institute also initiated a scheme on certification of potatoes at Kufri in the Simla Hills. Meanwhile the importance of long range research on potatoes on an all-India basis was being increasingly appreciated and in accordance with a recommendation of the Indian Council of Agricultural Research, the Central Potato Research Institute was established by the Government of India at Patna in 1949. This Institute, at its inception, took over the work of the three research stations of the Indian Agricultural Research Institute. In 1956, on the recommendations of an Expert Committee, the headquarter of the Director, Central Potato Research Institute was shifted from Patna to Simla.

C. Organisation

3. The Institute consists of a main station at Simla and two other research stations at Patna (Bihar) and Kufri (Simla Hills). Problems of regional importance are investigated at the five Regional Experimental Centres set up in the principal potato-growing regions of the country at Babugarh (Uttar Pradesh), Jullundur (Punjab), Ootacamund (Madras), Khed (Maharashtra) and Shil-

long (Assam). There is a Seed Development Station at Mukteswar (Uttar Pradesh) and a Seed Foundation Station at Phagu (Himachal Pradesh). A Station for breeding wart-resistant varieties has also been established in Darjeeling (West Bengal).

The Institute has 12 research sections, *viz.* Agronomy, Botany, Genetics and Cytogenetics, Seed Development and Production, Agricultural Chemistry, Biochemistry, Plant Physiology, Entomology, Plant Pathology, Virus Pathology, Agricultural Engineering and Statistics. The work of all the sections is coordinated by the Director, who is the technical and administrative head of the Institute.

D. Functions

4. The main functions of the Institute are:

- (1) Breeding and selection of high-yielding and disease-resistant varieties suited to different agro-climatic conditions in the country.
- (2) Determination of optimum standards of cultivation in relation to soil-climate complex and investigation of problems connected with storage.
- (3) Survey and investigation of major diseases and pests of the potato (in the field and in storage) with a view to devise control measures.
- (4) Building up disease-free nucleus foundation stocks of varieties for multiplication under the seed certification organisations in the States.
- (5) Training of personnel in different aspects of potato production.

CHAPTER II

BUDGET AND PLAN PROVISIONS

A. Budget

5. Following are the figures of expenditure incurred by the Institute during the last three years:

During the period 1961-62 to 1963-64 the total strength of the establishment was as follows:

B. Allocation and Expenditure during Third Plan Period

6. A total provision of Rs. 35 lakhs has been sanctioned for implementation of the following schemes at the Institute during the Third Five Year Plan:

1. Scheme for Production, Inspection and Certification of seed potatoes redesignated as scheme of Development and Production of Virus-free Nucleus Stocks of Potatoes (Central Part) in 1964.
2. Scheme for Improvement of library facilities and administrative staff of Central Potato Research Institute.
3. Scheme for Intensification of research at the existing research centres of Central Potato Research Institute.
4. Scheme for New Lines of Research.
5. Scheme for Building Programme of the Institute.
6. Scheme for Research on Cold Storage and maintenance for seed stocks and cultures under healthy conditions at Central Potato Research Institute.

The first five schemes were put into operation with effect from April, 1962, when the sanction for the schemes was issued.

The last scheme which is a modification of an original scheme provided under the scheme for New Lines of Research (No. 4 above) has been sanctioned in 1963. It has been stated that the 'Scheme for Research on Cold Storage' has been revised and is proposed to be sanctioned at a cost of Rs. 21 lakhs. A review of the physical performance of the schemes, targets etc. as well as the phasing of expenditure during the Plan period is given in Appendices I and II.

Excepting the foreign exchange of about Rs. 26,000 needed for machinery for planned storage scheme (which is to be provided in the budget of the Central Public Works Department) the foreign aid component for the Institute is nil.

C. Fourth Plan Proposals

7. The broad outlines of the schemes proposed by the Institute for inclusion in the Fourth Five Year Plan and the phased expenditure therefor are given in Appendix III. The total expenditure proposed for the execution of the Fourth Five Year Plan schemes is of the order of Rs. 67,69,000.

The Committee suggest that the schemes included in the Plan should be properly phased and expeditiously finalised in order to ensure that the objectives underlying the Plan provision are achieved. If Rs. 67 lakhs, proposed to be provided in the Fourth Plan, are to be put to good use, the Committee would suggest that detailed schemes should be drawn up in the earlier part of the Plan period so that these can be implemented in accordance with the phased programme.

CHAPTER III

POTATO CULTIVATION

A. Potato as Food

8. While the potato has developed as a food crop of the West, in the East it is still considered as a vegetable for the town dwellers. The consumption rate of potato in western countries is about 400 lb. *per capita* per annum, whereas consumption of potato in India is only 9 lb. *per capita* per annum.

As a subsidiary food crop, the potato has few rivals as it possesses in abundant measure the following qualities:

- (i) it provides wholesome nourishment, being a rich source of carbo-hydrates, minerals and vitamins;
- (ii) it has a high productive potentials with the added advantage of a high calorific output per unit area, two and a half times more than the cereals.

Its cultivation is also easy for the following reasons:

- (i) it is quick-growing crop with a very wide regional and seasonal adaptability;
- (ii) the potato continues to yield food from 60 days to over 150 days after planting; and
- (iii) it responds markedly to liberal doses of fertilizers and irrigation.

The Third Five Year Plan emphasises greater use of subsidiary foods such as potatoes, sweet potatoes and tapioca to help diversify the pattern of food consumption, promote balanced nutrition and to reduce demands for cereals whose supply is not abundant.

The primary need in India is of increasing the food resources. Since potato is a nourishing and adaptable subsidiary food, it presents an attractive source for augmenting food resources. The Committee would like the Central/State Governments to approach the problem of increasing potato production from this angle of national importance and to adopt a phased programme of increasing its production.

B. Production of Potato in India

Area under potato cultivation.

9. The area under potato cultivation in India is about a million acres, which comes to about 2.54 acres for every 100 acres under cereals as against 30.5 acres in Europe. The Committee have been informed that considering the limited acreage available for cultivation, it would not be possible to increase the area under potato cultivation and that no priority has been given by Government for increasing production of potato as food over other cereals.

Average yield of potato.

10. Following table gives the total production and average yield of potatoes in various countries of the world including India:

Sl. No.	Country	Average yield (Quintals/ hectare)	Total production '000 Metric tonnes	
			3	4
1	2		3	4
1	Netherlands	231	3142	
2	United Kingdom	210	6929	
3	Denmark	199	1731	
4	U.S.A.	196	11035	
5	Norway	194	1071	
6	Germany	180	34993	
7	Belgium	172	1466	
8	Austria	172	2946	
9	Canada	138	1697	
10	France	136	13264	
11	Sweden	119	1411	
12	Greece	116	484	
13	Italy	102	3954	
14	Turkey	101	1500	
15	Portugal	97	860	
16	U.S.S.R.	91	86568	
17	India	72	1731	
18	Others	...	100681	
	World	...	III	276,000

The average yield of potato in India during the last 12 years is as under:

Year	Average yield (Quintals per hectare)
1951-52	68.5
1952-53	78
1953-54	76
1954-55	66.5
1955-56	66.5
1956-57	60
1957-58	63.5
1958-59	71
1959-60	77.5
1960-61	75.5
1961-62	75
1962-63	75.25

From the above table it is apparent that the yield of potato per hectare is the lowest in India. The Committee note that the yield for the last 12 years has been more or less stagnant. The Committee consider this to be a failure to fulfil the main objective for which the Institute was set up. The Committee suggest that the Institute should devise a coordinated programme for increasing yield of potato per hectare. Such a programme should inter alia provide for supply of disease-free potato seeds, fertilisers, insecticides and pesticides, etc. Provision of ancillary services, such as storage, marketing and credit may also be ensured.

C. New Varieties of Potato

11. The Committee have been informed that as a result of a comprehensive breeding programme, several superior lines, incorporating characters well-suited to the different agro-climatic regions of the country, have already been produced or are likely to be produced. A list of improved varieties already released and likely to be released shortly, together with salient characteristics is given in Appendix IV. The existing varietal position in the potato growing States is given in Appendix V.

D. Production and Development of Disease-free Seeds

Virus-free foundation seed.

12. The work relating to development, production and supply of virus-free foundation seed of improved potato varieties under commercial culture in the country is organised in the following manner at the Institute:

- (i) Testing of tubers of selected single hill units for viruses X, S, A, Y and Leaf roll in the Virus Pathology Section at Simla.
- (ii) Development of virus tested hill units at Phagu.
- (iii) Production of virus-free foundation seed at Kufri.
- (iv) Multiplication of foundation seed at Mukteswar.
- (v) Supply of foundation stocks to the State Seed Multiplication Units and Regional Stations of the Institute.

In order to place the seed production and multiplication programme on a national basis, Dr. George Cockerham of the Scottish Plant Breeding Station, Edinburgh was invited under the Colombo Plan to advise the Institute on technical matters relating to the problem. Dr. Cockerham visited the Institute towards the end of 1962 and examined the different aspects of the seed production programme and advised the development of virus tested stocks with reference to the techniques and procedures of raising, sampling and testing of seed.

With the up-to-date techniques developed and standardised at the Institute for seed testing, Kufri and Phagu stations form the main foundation of seed certification work in India and constitute the only source in the country for the supply of disease-free nucleus seed to the seed multiplication centres in the different States.

Under the Second Five Year Plan, a scheme for the production of disease-free foundation stocks was initiated

9

at the Central Potato Research Institute. As a consequence a central nucleus organisation for building of disease-free foundation stocks was set up at the Central Potato Research Institute and the work was undertaken at Kufri Sub-Station of the Institute.

13. The Institute had prepared a scheme for production, Scheme for inspection and certification of disease-free seed potatoes in India and later on redesignated as 'Scheme of Development and Production of Virus-free Nucleus stocks of disease free Potatoes (Central Part)', in 1964, for inclusion in the Third Five Year Plan. Under the scheme while the Centre was to be responsible for maintenance and production of disease-free foundation stocks of the commercial varieties, it was to be the responsibility of the States concerned to further multiply the stock supplied, first in the hill areas and later, once or twice, in the plains under conditions of low virus incidence. The scheme aimed at the replacement of the existing degenerated seed stocks by healthy seed stocks of improved varieties in five stages from 1960-61 to 1964-65. In 1965-66 about 1,39,40,000 maunds of good seeds were expected to be produced. The expenditure involved for the Central part of the scheme for the 5 year period ending 1965-66 was estimated at Rs. 2.00 lakhs.

The Committee have been informed that the central part of the scheme was sanctioned and put into operation but the State part of the scheme was not fully implemented. A new scheme was prepared by the Indian Council of Agricultural Research and circulated to the State Governments in March, 1964. Under the new scheme emphasis has been placed on production of healthy seed potatoes in plains through seed plot technique developed at the Central Potato Research Institute. In the original scheme the Central Potato Research Institute was to provide technical and advisory help directly to the States, but in the revised scheme the role of the coordination has been taken over by the Indian Council of Agricultural Research. The Committee have been informed that response from Madras and Orissa to the new scheme has been very favourable and they have included the scheme in their Third Five Year Plans. Response from other States is still awaited.

The Committee regret that even in the fourth year of the Third Plan, the Government and the Institute have not been able to make the States interested in taking up the implementation of the scheme of the Third Plan. The Committee consider that research should not be divorced from its practical application in the country. If the valuable materials and techniques developed at the Institute after years of concentrated research are not to be relegated to a research pigeon-hole but to be put to effective use in the field, it is patent that the role of the Institute should not only be that of a leader in research but it should also have a role to play in the actual cultivation. The Committee are aware that the question of providing any exclusive extension wing for a particular research institute is linked with the broader problem of the role and functions of the Indian Council of Agricultural Research, Directorate of Extension and the State Agricultural Organisations. The Committee would suggest that a high-powered committee may be constituted urgently to go into the matter in all its ramifications and evolve a solution which would provide an effective and purposeful link between the research institutes and the tiller of the soil so that the results of research come to the aid of the nation in these pressing times of food scarcity

E. Multiplication of Healthy Seeds in the Plains through Seed Plot Technique

14. As the higher hill regions in India can at best produce only about 25-30 per cent of the total seed requirement of the country, work has been undertaken at the Institute to devise ways and means to raise healthy seed crops in the plains where nearly 90 per cent of the total area under potatoes exists. Based on a detailed survey of aphid incidence and build-up of its populations in the plains, a new technique of production of healthy seed potatoes in the plains during low aphid infestation period has been developed at the Institute. The new technique has been adopted at the Institute's Regional Stations and has been recommended to the potato growers in Jullundur district who have adopted the new technique under the supervision of the Institute staff and have reported satisfactory results. The main advantages of the new technique according to the growers are said to be the following:

- (i) the crop raised from seed obtained from the October-January crop has been very healthy as compared to the crop raised from normal seed which showed virus infection to the extent of 30-40 per cent.
- (ii) the table crop raised from healthy seed has given a more uniform germination, more vigorous stand and higher yield as compared to the normal crop (while the former

has given an yield of 92.5 quintals per acre, the latter has yielded only 70.3 quintals—32 per cent increase in yield through use of healthy seed); and

(iii) adoption of the seed plot technique has not only ensured production of healthy seed but has also ensured independence from the costly hill seed.

A scheme for location of areas and periods of low aphid incidence in the plains was formulated in 1962 and submitted to the Indian Council of Agricultural Research. The scheme has been accepted by the Indian Council of Agricultural Research and sanction for implementation of the scheme in three of the States viz., Uttar Pradesh, Madras and Jammu & Kashmir, has been issued by the Indian Council of Agricultural Research. The States of Assam, Bihar and Rajasthan have regretted their inability to execute the scheme. The implementation of the scheme in the States of Madhya Pradesh, Punjab and West Bengal is still under consideration of those Governments. During the course of evidence, the Special Secretary of the Ministry of Food and Agriculture (Department of Agriculture) informed the Committee that he would hold a meeting of Secretaries of Departments of Agriculture of States where potatoes can be grown to draw their pointed attention to the adoption of seed plot technique for growing healthy seeds in plains.

In view of the fact that the total area available for the production of seed potatoes in the hills is limited and that the scattered nature of the available area also presents several problems such as transport, timely supply of seeds, etc., the Committee recommend that the seed plot technique should be made use of to the maximum extent possible so as to saturate the entire potato area of the country with seed potatoes in the phased programme of five years.

F. Distribution of Foundation Seeds

15. The total foundation seed stocks produced and supplied by the Central Potato Research Institute to its various Regional Stations and State Governments under the scheme for large scale multiplication of disease-free seed potatoes during the period 1961-62 to 1963-64 is as follows:

Year	Production (Qts.)	Supply		
		States (Qts.)	Regional Stations	Total
1961-62	1369.74	677.10	439.56	1116.66
1962-63	1246.68	333.44	629.48	962.92
1963-64	926.62	263.54	309.53	573.07

The anticipated target of production of foundation stocks for the rest of the Plan period is as follows:

Year	Production (Qts.)
1964-65	1200
1965-66	1500

Following table indicates the quantities of healthy seeds produced and distributed to States during 1963 from the Northern Regional Stations of the Institute:

Station	Production	Supply
(In Quintals)		
Jullundur	1674.02	438.00
Babugarh	2315.775	358.64
Patna	1230.84	60.00
Poona		
Shillong	145.00	45.75
TOTAL	4187.205	889.10

The quantity of seeds produced and distributed from the Southern Regional Station (Potato Experimental and Trial Centre, Ootacamund) during summer, 1963 and autumn 1963 is as under:

Total production (in Qts.)	Distribution in Quintals							
	Madras	Andhra	Kerala	CFTRI Mysore	Other Regional Stations	CPRI	Others	Total
556.23	141.45	1.86	34.04	3.40	1.37	73.215	255.335	

The Committee note with concern that the production of foundation seed stocks at the farms of the Institute has been progressively decreasing. The Committee further note with regret that the total quantities of the foundation seeds produced at the Institute's farms and healthy seeds produced at the regional stations are not distributed fully to the States for further multiplication. The Committee need hardly emphasise that the Institute should have made proper arrangements to distribute all the healthy seeds produced at the farms of the Institute and regional stations to the States and progressive farmers. The Committee, however, expect that necessary remedial steps in this regard would be taken without any delay.

CHAPTER IV

TRAINING OF PERSONNEL

A. Suggestions of the First Tuber Crops Committee

16. The First Tuber Crops Committee (1959) made recommendation that in view of the fact that the potato is a specialised crop, requiring special training for its successful culture, it is necessary to institute some suitable training courses. The following four courses were suggested:

- (1) Post-graduate training leading to M.Sc. and Ph.D. degrees for manning research posts connected with tuber crops at the Institute and with States;
- (2) One year diploma course for training technical personnel engaged in potato development work;
- (3) One month certificate course for inspectors to be employed under the potato seed certification scheme;
- (4) Two week certificates course for the village level workers and farmers interested in the seed potato production.

So far the Institute has been able to introduce training at post-graduate level leading to M.Sc. and Ph.D. degrees only. One month certificate course at the Sub-stations of the Institute has also been sanctioned in January, 1965.

B. Post-graduate Training

17. The Punjab University has recognised the Central Potato Research Institute for purposes of post-graduate training in:

- (1) Botany including plant breeding and genetics.
- (2) Cytogenetics.
- (3) Plant pathology including Virus pathology.
- (4) Plant physiology including Agricultural Chemistry.
- (5) Agronomy.

This course of training is arranged in cooperation with the Indian Agricultural Research Institute, New Delhi. Research facilities to students opting for research on potato are provided at the Institute.

C. One year Diploma Course

18. There are no permanent arrangements for imparting training to technical personnel engaged in potato development. The Institute makes *ad hoc* arrangements to impart training to the personnel of various States Departments of Agriculture. The number of candidates trained till June, 1963 is given below:

State	No. of candidate trained
Uttar Pradesh	6
Punjab	1
Himachal Pradesh	6
Nagaland	1
TOTAL	14

Besides the training of personnel from the States of India, the Institute also imparts training to students from the South East Asian countries. Two students from Ceylon and one from Philippines have completed their training.

The Committee on Achievement Audit (1960) has remarked that the lack of adequately trained personnel for the scientific culture of potato is one of the reasons for the poor progress in the States and that the one year's diploma course recommended by the Tuber Crops Committee long back should be immediately instituted.

The Institute accordingly prepared a scheme for instituting a one-year diploma course (open to all interested in the potato cultivation), as a permanent feature of the Institute. The scheme envisages training of 30 students annually drawn from States as follows:—

State	No. of trainees to be admitted annually
Assam	4
Bihar	4
Madras	1
Punjab	2
Rajasthan	1
Uttar Pradesh	6
West Bengal	5
Himachal Pradesh	3
NEFA and Tripura	2
Jammu & Kashmir	2
TOTAL	30

The proposal of the Institute is still under consideration of Government.

The Committee regret to note that Government have not given serious consideration to the suggestions made by the First Tuber Crops Committee (1959) and the Committee on Achievement Audit (1960) for introduction of diploma course on a permanent footing to train personnel of State Departments of Agriculture and Agricultural Extension Officers of Development Blocks which is one of the main functions of the Institute. The Committee recommend that decision on the scheme submitted by the Institute should be expedited.

D. One Month Certificate Course

19. This course is proposed to be instituted for training inspectors in the inspection service as soon as the seed certificate organisation is set up in the country.

E. Two-Week Certificate Course

20. This course is proposed to be instituted as soon as the farms are set up under the seed certification organisation.

The production, certification and grading of potatoes is a highly technical job and as such suitably trained and experienced hands will be required to tackle the day to day problems. The Committee recommend that the training facilities available at the Central Potato Research Institute should be fully made use of for training the technical staff of the State Departments of Agriculture, and also of the Agricultural Extension Officers of the Development Blocks.

CHAPTER V

DISEASES OF POTATO CROP

A. Diseases of Potato Crop

21. From the point of view of the distribution of pests and diseases, the potato growing areas can be grouped in four regions, e.g., (i) the hill areas of Himalayas, (ii) the northern plains, (iii) the Deccan plateau area, and (v) the hills of Southern and Western India (Nilgiris and Mahabaleswar).

The Himalyan Hill Areas.

22. At higher elevations, the important problem is to tackle Epilachna beetle and the white grubs. These areas are generally free from the common virus diseases of potato. The seed materials are subject to attack of the late blight diseases. At medium and lower elevations, in many parts the brown rot, late blight and early blight present serious problems. These areas constitute an important source of seed potato for the plains and thus also of the transmission of diseases with it.

The Northern Plains.

23. About two decades back, the virus diseases presented the most serious problems, which have been greatly overcome by raising and distributing disease-free seeds. The tuber moth used to be a serious problem for the storage of seed potatoes in the past. It has been stated that it is now possible for the growers to protect their seed against tuber moth by using chlorinated hydrocarbons. The black scurf disease, which was almost non-existent, is now presenting a serious problem in parts of Punjab and Orissa. The early blight has continued to appear sporadically over the entire area, sometimes assuming serious proportions. Aphids also continue to cause losses in this region. There are minor diseases of regional importance, e.g., charcoal rot in northern Bihar, root eel worm in Chhota Nagpur and Himalayan region of Punjab, Himachal Pradesh and Uttar Pradesh.

The Deccan plateau areas.

24. Serious problem in these areas has been the brown rot or the wilt disease. The late blight disease occurred in Mysore in 1961 in a virulent form. Aphids appear to be widely prevalent.

25. In these areas, the serious problem in the past was the early blight. Virus diseases are also common. More recently, in the Nilgiris the late blight disease appeared suddenly in a devastating form causing serious losses. It has been recently discovered that the golden nematode is prevalent in the Nilgiri hills. Among the minor diseases, silver scurf is common but common scab and powdery scab appear to be rare. Aphids are widely prevalent.

Hill Areas
of Western
and
Southern
India.

B. Late Blight

26. The Committee have been informed that the epiphytotic of the late blight is favoured by a combination of weather conditions. The interaction of these factors in initiation of the epiphytotic has been studied critically in many countries and forms the basis, almost with mathematical accuracy, of disease forecasting. The Study Group of the Estimates Committee which visited the Institute in October, 1964 were informed that the timely warnings to farmers, at least ten days ahead of incidence of late blight, would save 10 to 20 per cent of the loss.

As the yield of potato in India is almost the lowest in the world and it is not precisely known as to what extent among other factors, the yield is depressed by pests and diseases, the Committee suggest that the Institute should undertake a study to ascertain the incidence of diseases and pests in potato cultivation and take necessary preventive steps.

The Committee also suggest that effective control of blight disease and a correct method of forecasting the disease should be evolved in collaboration with the Indian Meteorological Department.

C. Diseases of Imported Seed Potatoes

27. The Committee understand that seed potatoes are imported directly by the States. Unregulated imports of potato seeds are likely to bring in exotic pests and diseases or new physiologic forms or parasite strains. The Committee suggest that in order to prevent spread of pests and diseases through imported seed potatoes the need for a proper control on the import of seed potatoes may be impressed on all the States.

D. Insecticides

28. The Second All India Potato Workers' Conference (1963) had observed that "the non-availability of certain insecticides and fungicides like Dithane Z-78 makes the potato culture risky and often unprofitable."

The Committee have been informed during evidence that there is no system of assessing the actual damage done to potato crop due to lack of pesticides. It has, however, been admitted that in 1963 there had been a shortage of Dithane in several places in West Bengal and Madras.

The Committee have further been informed that about 65 percent of the current need of pesticides in the country is being met from indigenous sources. Thirteen pesticide industrial units have been licensed for manufacture of some eight insecticides like para-thion, lindane, zineb, etc.

The Committee recommend that as the plant protection chemicals are essential for the success of the potato crop, all efforts should be made to produce these chemicals in sufficient quantities indigenously to meet the increasing demands of the cultivators. The Committee suggest that the matter may be taken up with the Hindustan Insecticides Ltd.

E. Anti-sera for Common Virus Diseases

29. The Committee understand that the work on production of anti-sera against potato viruses has been recently initiated at the Central Potato Research Institute. Anti-sera against common potato-virus diseases have already been developed.

The Committee are glad to note that anti-sera for common virus diseases have been developed at the Institute. The Committee suggest that the possibility of commercial exploitation of anti-sera through the National Research Development Corporation may be explored.

F. Seed Control Programme

30. The Second All India Potato Workers' Conference held in 1963 made the following recommendations as regards the Seed Control Programme and Seed Certification Service:—

"(i) A seed control programme should be initiated in all areas demarcated for the production of seed potato, fixing workable standards of purity, germination, freedom

from various diseases, viruses and nematodes. The Central Potato Research Institute may lay down feasible standards in this regard in consultation with the State Pathologists. Necessary arrangements for packaging and sealing of certified seed potatoes should also be made. To do all this work effectively, a seed certification service be immediately established in all the States where seed potato production work is intended to be taken up.....

- (ii) The Conference noted that Seed Certification was one of the surest ways to raise the potato production. So far, freedom from certain important viruses only is taken into account in seed certification scheme. The Conference, therefore, recommended that the scope of certification should be further expanded to include other tuber-borne diseases, specially brownret, scab and golden and root-knot nematodes, and tolerance for them may be defined. The Conference, therefore, recommended that this work should be entrusted to a small committee of experts."

The Committee have been informed during evidence that Government have no proposal for establishing seed certification service but the seed certification law would be gradually extended to potatoes as soon as the difficulties relating to cold storage are solved.

The Committee have also been informed that the Indian Standards Institution has drawn up different standards of purity of seeds which have been circulated to State Governments. The standards of purity would be finalised after taking into consideration the views of the State Governments.

The Committee consider that the distribution of pure seed potatoes free from virus and other diseases is of paramount importance, if production of potatoes has to be augmented. The Committee are concerned to note that so far no machinery has been set up for grading of seed potatoes and the question of evolving suitable standards of purity has yet to be finalised in consultation with the States. The Committee cannot too strongly urge the need for grading seed potatoes according to standards of purity to be laid down by the Indian Standards Institution before distributing the same to the farmers. The Committee suggest that energetic steps may be taken to pursue the matter and finalise the standards of purity as expeditiously as possible.

CHAPTER VI

MISCELLANEOUS

A. Potato Technology

31. In regard to the research being done by Central Potato Research Institute on use of dehydrated potato flour as a supplement to the cereal diets and use of potato for industrial uses the Committee on Achievement Audit (1960) made the following observations:

"The Committee considers that this item of work falls outside the scope of the research programme of the Institute and recommends that the Government of India should take up this issue with the Central Food Technological Research Institute, Mysore, who should be asked to work up this project in co-operation with the Potato Institute".

A small Committee of experts had been appointed by the Second All India Potato Workers' Conference (1963) who formulated a programme of research and development relating to the potato processing in the country. The above Conference recommended "that a new section on 'Potato Technology' be added to Central Potato Research Institute, Simla, where carefully planned programme of research is carried out to the best of advantage of the potato growers, and the potato processing industry. Until a section on 'Potato Technology' is established at Central Potato Research Institute, immediate research may be undertaken on the above lines in collaboration with Central Food Technological Research Institute, its regional stations, and State Canning and Preservation Units."

It has been stated that Government of India have consulted the Central Food Technological Research Institute on the Scheme. The views of the Central Food Technological Research Institute and Central Potato Research Institute are now under consideration of the Government of India.

The Committee feel that the research on technological aspects of the potato crops should be kept out from the programmes of the Institute and that the technological research on potato can be suitably carried out by the Central Food Technological Research Institute in collaboration with Central Potato Research Institute as suggested by the Committee on Achievement Audit. The Committee hope that Government will take an early decision on this matter which is pending since 1960.

B. Import of Seed Potatoes

32. Hitherto, India has been importing seed potatoes from several countries. With the establishment of seed multiplication organisation in the country, good seed potatoes are becoming increasingly available and imports from abroad are now largely restricted.

India is importing about 26,000 bags (15,145 quintals) of D.R.R. variety from Sikkim and Nepal. Approximately 16,000—19,000 bags of seed potato of Military Special are imported annually from Burma. Recently India has imported 40,000 maunds of Burma seeds at a cost of about Rs. 10 lakhs. India is also importing potato seeds "Great Scot" from United Kingdom (Scotland).

33. It has been stated that among the several varieties under commercial cultivation in India, 'Up-to-date' is one of the most important for raising early crops. Good and pure seed stocks of 'Up-to-date' variety are being raised on a large commercial scale in Himachal Pradesh, Uttar Pradesh and Punjab. Stocks of this variety also continue to be imported into India from Burma under different names, such as Rangoon, Military Special, or Sit-Bo. Detailed botanical examinations carried out at the Central Potato Research Institute have confirmed that the seed potatoes imported from Burma correspond mostly to the 'Up-to-date' variety now available in the country. The traders, however, still seem to regard imported Burma Seed potatoes as superior to 'Up-to-date' in yield and quality of produce. The Committee have been further informed that potato seeds of 'Up-to-date' variety had been compared with imported Burma seed for yielding capacity in 57 trials laid out in cultivators' holdings in the State of Uttar Pradesh, West Bengal, Punjab, Rajasthan, Madhya Pradesh and Orissa. The results showed 'Up-to-date' variety to be far superior to the Burma potato and the percentage yield increase in favour of the former being about 95 per cent.

*'Up-to-date'
variety su-
perior to
Burma seed.*

The Committee have been also informed that good varieties of potato such as 'Up-to-date' are grown in the country under various names. Not only does the multiplicity of names cause confusion with regard to varietal identity, such a state of affairs is often a source of irritation and loss of money to the cultivators.

The Committee suggest that the Central Potato Research Institute should compile accurate information on the Indian commercial varieties which can replace, with advantage, the imported varieties and disseminate such information to the Departments of Agriculture of States for the benefit of traders who have a preference for the imported potato seeds. The committee further suggest that Government should have a phased programme of curtailing and finally stopping imports of potato seeds.

C. Cost of Potato Seeds

34. The Committee have been informed during evidence that the imported seeds cost about Rs. 25 per maund whereas the price of potato seed in Simla is about Rs. 40 per maund. The Committee also note that price of seed accounts for about 50 per cent of the cost of potato cultivation.

The Committee are surprised that the price of indigenous seeds is 60 per cent higher than that of the imported seeds. The Committee would like to invite attention of Government to the recommendation contained in para 14 of the Report and further recommend that urgent steps should be taken to bring down the cost of indigenous potato seeds so that the cost of seed may not exceed 25 per cent at most of the total cost of cultivation.

D. Cold Storage and Maintenance of Seed Stocks

35. It has been stated that one of the major problems in the way of extension of potato-culture in the country is the difficulty experienced in storing seed potatoes in the plains between the months of April and September.

In 1960 the number of cold storages was 261. These stores accommodated 8 million maunds (2.99 million quintals) of potatoes, major part of which has been utilized for seed purposes. On the basis of existing acreage, the quantity of seed for use in the plains works out to about 14 million maunds (i.e. 5.23 million quintals). About 50 per cent of seed potato requirements in the plains of India is still met from the seed potatoes preserved in country stores.

The Committee have been informed that Government's experience about the operation of cold stores in the country has not been a very happy one. It has also been mentioned that the cold storage authorities push up the price of seed potatoes for profiteering purposes.

. The Committee regret that in spite of the very clear recommendation of the Rural Credit Survey in 1954 that warehousing facilities are to be created only through three agencies—the Central Government, State Government, and the co-operative organisations—and whenever necessary, also to be financed and subsidised by the Government, there have been no attempts to set up a chain of warehouses for storage of agricultural products for the benefit of the producers and there have been so much indiscriminate sanctions of private cold storages that these have now become more an instrument of cornering of goods and pushing up of prices rather than of giving the expected benefits to the actual producers. The Committee recommend that to eliminate the inordinate rise in prices of potato seeds, a phased programme should be taken up for setting up of cold storage within the control of the Government under the Warehousing Corporation Act or through producers' co-operative societies Government should also restrict the issue of indiscriminate licences to private parties for opening of cold storage houses, to avoid undue rise in prices of vital agricultural products like potato seeds.

...

E. Scheme for Research on Cold Storage

36. The Central Potato Research Institute is breeding new varieties of potatoes and these are now being supplied through the State Departments of Agriculture to the cultivators. Very little is known about the condition of storage of the newer varieties.

The 'Scheme for Research on cold storage' of the Institute was sanctioned in the year 1963 at a total cost of Rs. 6,98,300 for completion during the remaining period of the Third Plan. The object of the scheme was to conduct research on the cold storage of potatoes, so that technical information could be made available on this aspect of potato preservation.

The Indian Council of Agricultural Research taking note of the need for research on cold storage problems of vegetables and fruits proposed that investigations on cold storage of commercial fruits and vegetables should be carried out on a co-ordinated basis in the country. The Scheme has been revised in the light of the recommendations made by the Sub-Committee appointed by the Indian Council of Agricultural Research for drawing the details of the proposed co-ordinated scheme. The revised Scheme visualises establishment of two experimental chambers at Patna and Babugarh and three bulk cold storages at Patna, Babugarh and Jullundur. The revised Scheme would cost Rs. 21 lakhs.

The work will be carried out through the agency of the Central Public Works Department. Drawing for cold storage plants have been approved and preparation of estimates by that Department is under way. Research work is likely to be initiated in some centres in summer 1965 at the earliest.

At present no facilities for storage of experimental and breeding stocks of disease-free varieties and hybrids are available at the Institute. It has been stated that the working limitations at the Institute make it possible at present to produce annually about 10,000 maunds of seed material and these are stored in commercial chambers at a cost of about Rs. 40,000/- per annum. With the increasing resources now proposed to be made available, the Institute has plans to substantially increase the production of disease-free foundation seeds and produce about 30,000 maunds per annum at the three regional centres (Jullundur, Babugarh and Patna) in the plains.

It has been stated that the cold storage facilities at the regional stations will enable the Institute to conduct several agronomic investigations connected with pre and post-cold storage treatment of seed potatoes and its influence on germination and yield.

The Committee recommend that the scheme for research on cold storage and maintenance of seed stocks and cultures under healthy conditions should be expeditiously executed and the results disseminated to the organisations manning cold storage plants.

F. Germ Plasm Bank

37. The Committee have been informed that a proposal was made in 1963 by the Director of the Central Potato Research Institute for the creation of an 'International Germ Plasm Bank' in South and Central America, from where it should be possible for India to draw, from time to time, appropriate raw materials for improvement of potato varieties under sub-tropical situations. The Committee have also been informed that the proposal of the Director would be examined by Government in consultation with Dr. Neiderhauser, who is working on the International Potato Development Problems and is expected to visit India in 1965.

The Committee welcome the idea of setting up an International Germ Plasm Bank and hope that Government would pursue the matter further.

G. Annual Reports

38. The Committee find that Progress Reports of the Scientific work of the Institute have not been published regularly e.g. Progress Report of the Scientific work for the period from August, 1944 to March 1956 was published on the 18th March, 1957; Scientific Report for the years 1958 to 1960 was published on 4th May, 1962; Scientific Report for the years 1961 and 1962 was published on 7th June 1963. The Scientific Report for the year 1963 is yet to be published.

The Committee need hardly stress that the Reports of the Institute should be published regularly within six months of the close of the year, if they are to be of any practical use to the scientists and others interested in the subject.

H. Popular Material

39. The preparation of materials of popular interest has not so far received much attention at the Institute nor are there appropriate personnel and resources for execution of this work on an organised basis.

In this connection the Committee desire to draw the attention to the following observation of the Minister of Food and Agriculture:

“Research by itself will be little avail unless its results in practical and assimilable form are not carried to the farmers in the fields. It is the dissemination of scientific information that is the crux of the problems of modernisation of agriculture.”

The Committee urge that the Institute should display the same zeal in purveying scientific data to the farming community which the scientists do in their laboratories.

NEW DELHI;

ARUN CHANDRA GUHA.

March 19, 1965.

Chairman.

Phalguna 28, 1886 (Saka).

Estimates Committee.

APPENDIX I

(Vide para 6)

Physical performance of the schemes, targets etc. included in the Third Five Year Plan

1. Scheme for production, inspection and Certification of seed potatoes

The main objective of the scheme is to replace the existing degenerated seed stocks by healthy seed stocks of improved varieties in five stages from 1961-62 to 1965-66. By 1965-66 the country will need about 51.16,000 quintals (1,39,40,000 mds.) of good quality seed.

The seed production and supplies during 1961-62, 1962-63, and 1963-64 have been as under:—

Year	Production (in quintals)	Supply to States (in quintals)
1961-62	1,369.74	1,116.66
1962-63	1,246.68	962.92
1963-64	926.62	573.07

The anticipated target of production of foundation stocks for the rest of the plan period as given above is likely to be achieved by 1965-66 for the country by present rate of supply of nucleus of seed stock from Central Potato Research Institute yearly.

2. Scheme for Intensification of Research

This is supplementary to work in progress at the Institute being carried out under various sections and the Regional Stations. The main objective is to intensify the present researches on different problems related to potato improvement for obtaining quick practical results, therefore, no targets in term of physical unit were envisaged. The various projects under the scheme are in progress.

3. Scheme for New Lines of Research

The scheme is of two parts; (i) research on the storage problems of potato; and (ii) studies on utilization of radio isotope techniques assessing fertilizer and micro-nutrient requirement of potato crop.

The scheme on storage problem of potato has been since revised and sanctioned by Government of India only in 1963. The work of establishing cold storage at Patna, Jullundur and Babugarh stations of the Institute are in progress and as seen they are ready. the research will be started.

Preliminary work of the second part of the scheme (with studies on utilization of radio isotopes, techniques assessing fertilizer and micro-nutrient requirements of potato crop). Part equipments for the organization of the research has been received from the Atomic Energy Commission, Trombay.

No targets under the scheme are envisaged.

The various schemes under the Scheme are in progress.

4. Scheme for Improvement of Library facilities and administrative staff of Central Potato Research Institute.

The scheme mainly provides facilities by way of additional staff needed for carrying out increased volume of administrative work as a result of increase in the research and development activities of the Institute. All the posts sanctioned under the scheme (with the exception of Sweepers which are kept in abeyance due to emergency) have been filled.

5. Scheme for Building programme of Institute.

The programme of work and functions of the Institute were reorganised in the year 1956 as a result of which a number of Regional Research Centres were established in different potato growing areas. Facilities for laboratory buildings, glass houses, office accommodation, storage sheds etc. were inadequate in the existing stations of the Institute and in the Regional Research Centres newly established. New Buildings and irrigation facilities necessary for the working of the centres had to be provided. Considerable progress has been made in the construction works which were put up through the C.P.W.D. agency. During the plan period from 1st April, 1961 to 31st March, 1964 the Government of India have sanctioned capital works at the Institute and its Regional Centres to an extent of Rs. 15 lakhs. Major part of the sanctioned amount has been utilized. A total provision of Rs. 21:32 lakhs for capital works has been approved for the 3rd Plan period and it is expected that the entire amount will be utilized by the end of the Plan period.

6. Scheme for Research on Cold Storage.

The scheme sanctioned in the year 1963 at a total cost of Rs. 6,98,300/- during the remaining Third Plan period has been revised and is being sanctioned at a cost of Rs. 21 lakhs. The objective of the scheme is to conduct research on the cold storage of potatoes, so that technical information is made available on this aspect of potato preservation. Under the scheme three cold storage plants will be constructed, one each at the Patna, Babugarh and Jullundur Regional Stations of the Institute. The work will be carried out through the agency of the C.P.W.D. is underway. The work of the scheme will be started effectively as soon as the cold storage are ready.

APPENDIX II

(Vide para 6)

Statement showing phasing of expenditure on Third Five Year Plan Schemes

(Figures in lakhs of rupees)

S. No.	Scheme	3rd Plan		61-66		61-62		62-63		63-64		64-65		1965-66		1961-66	
		Total provision	Capital	Actual Expendi- ture	Actual Expendi- ture	Actual Expendi- ture	Anticipa- ted Expendi- ture	Actual Expendi- ture	Anticipa- ted Expendi- ture	Anticipa- ted Expendi- ture	Capital	Anticipa- ted Expendi- ture	Capital	Anticipa- ted Expendi- ture	Total estimated expendi- ture 1961-66	Remarks	
1	Scheme of Development & Production of Virus-free Nucleus stocks of potatoes (Central part)	2.00	..	..	..	0.23	0.40	0.52	0.65	0.65	..	..	1.80	..	..	1.80
2	Scheme for Improvement of Library facilities and administrative staff of C.P.R.I.	2.25	..	..	..	0.30	0.51	0.55	0.67	0.67	..	..	2.03	..	..	2.03
3	Scheme for Intensification of research at the existing research centres of C.P.R.I.	7.78	..	..	..	0.70	1.76	2.36	2.64	2.64	..	..	7.46	..	..	7.46
4	Scheme for New Lines of Research	0.50	..	..	..	0.07	0.08	0.14	0.15	0.15	..	..	0.44	..	..	0.44

5 Scheme for Construction programme of the Institute	21.32	21.32	2.06	1.96	2.37	6.50*	..	5.00	17.89
6 Scheme for Research on cold storage & maintenance for seed stocks and culture under healthy conditions at the C.P.R.I.	1.15†	..	..	..	..	..	..	..	..
TOTAL	35.00	21.32	2.06	3.26	5.12	10.07	4.11	5.00	29.62

*From 1-1-1964 the provision is being made under the Demands of the Works and Housing Ministry.
 †The Capital Expenditure of the Scheme has been included in the Construction Programme of C.P.R.I. The Scheme in question is being revised and is proposed to be sanctioned at a cost of Rs. 21 lakhs.

APPENDIX III

(Vide para 7)

Statement showing phasing of expenditure on the Fourth Five Year Plan proposals

Title of the Project	1966-67	1967-68	1968-69	1969-70	1970-71	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
I. INTENSIFICATION OF RESEARCH						
1. Intensification (strengthening of Research Projects already in Progress)	1,15,000	2,50,000	3,80,000	4,85,000	5,70,000	18,00,000
II. NEW LINES OF RESEARCH						
2. Establishment of two regional stations: one in Assam plains and the other in Mysore State.						
3. Development of new lines of agronomical research particularly in the hills with specific reference to (a) standardisation of cultivation practices to minimise soil erosion; (i) standardisation use of foliar nutrition; and (c) problems of fertilizer fixation in Acid soils for use of soil ameliorants in relation to disease control.						
4. Research on potato nutrition through the use of radio isotopes tracer technique.						
5. New lines of research on potato virus with special reference to (a) development and use of serological techniques for virus research; (b) physiological studies on host virus relation-	2,40,000	3,75,000	5,10,000	7,25,000	7,69,000	29,69,000

ship; (c) studies on virus host vector relationship; (d) study of different sources of resistance and their utilization in breeding work; and (e) Study of the strainal relationship of viruses and their significance on breeding for virus resistance.

6. Creation of facilities for examination of nutrition and food value of potato varieties in breeding stocks.
7. Development and standardisation of techniques on a pilot project basis for production of healthy seed potatoes in the plains with special reference to (a) use of serological and other techniques for testing (b) devising methods of mass testing systems as an aid to seed certification and (c) creation of a central pool of disease-free tested stocks in the plains to fit the seed certification organisation in the States.
8. Training of personnel in potato production and certification.
9. Inaugurification of administrative machinery and improvement of Library facilities at the Regional Stations of CPRl.

III. CONSTRUCTION PROGRAMME

10. Scheme for construction programme at the Central Regional Stations of the Institute. (Residential and non-residential buildings like glass-houses)

8,00,000

3,00,000

3,00,000

3,00,000

20,00,000

APPENDIX IV

(Vide para 11)

Salient characteristics of the improved potato varieties selected and evolved at the Central Potato Research Institute, Simla.

A. Varieties already released

1. *Up-to-Date (Disease-free clone)*: A selection from a grower's field in Northern Ireland introduced into India in 1946; early maturing with oval, white, attractive tubers, grown extensively in the hills and plains of North India and also in the plains of Mysore. An excellent and dependable cropper, this variety shows quick growth and a well balanced spreading foliage which covers the ground quickly; in the plains it is suitable as early, main and spring crop variety wherever such crops are raised. Extreme susceptibility to diseases is the main draw-back of the variety. Being a variety which has to build up yield within a short time, it requires good fertile soil and sustained nourishment. It responds favourably to nitrogenous fertilizers and potassic fertilizers are also necessary for good yields.

2. *Craigs Defiance*: Introduced from Scotland in 1936, it is an early maturing variety both in the hills and the plains of North India yielding excellent crops of long, white tubers. It was one of the leading types in the hills till 1952 but later on was found to develop extensive brown spotting in the flesh and suffered on that account a set back. It is now favoured in the plains of the Punjab. It responds admirably to liberal doses of fertilizers particularly to a high dressing of potash. It is field immune to two important viruses X and A but is very susceptible to virus Y.

3. *Kufri Red*: A high yielding clone selected from Darjeeling Red Round superior to it in yield and quality of tubers and is a profitable substitute for it; it is medium in maturity in the plains with red round tubers and has a high yield potential under short day conditions. Suitable as a main crop variety in the plains of Punjab, Uttar Pradesh and Bihar. Being susceptible to virus disease, it is necessary to frequently renew seed of the variety from hills.

4. *Kufri Safed*: A high yielding clone selected from Phulwa; a late maturing variety with white, round tubers and a good substitute for Phulwa; a hardy variety suitable for poor soils; it has an excellent keeping quality.

5. *Kufri Kuber*: A promising early variety suited for the plains of Uttar Pradesh, Bihar, Maharashtra and Mysore. It is extremely quick-growing in habit and covers the ground very rapidly. Like Up-to-Date it can be used for early crop. Its tubers are oval, white and of uniform medium size. It requires adequate quantity of nitrogen for its quick growth and liberal supplies of potash for maximisation of yields; yields uniform tubers on light type of soils but is inclined to give irregularly-shaped tubers on heavy lands; shows some resistance to degeneration diseases.

6. *Kufri Kundan*: A promising hybrid in the hills of North India where it yields assured crops especially in years of late blight epidemics to which it shows a good degree of field resistance. One of the chief merits of this variety is that it stands water-logging conditions better than any other variety and therefore is preferred for cultivation in heavy, clay soils. It has white, oval tubers.

7. *Kufri Kisan*: A medium late hybrid yielding an excellent crop in the plains comprising a greater proportion of large-sized tubers. In the hills, however, its yield is low and it produces only a few small-size tubers. It produces a good foliage mass which covers the ground well and does not allow the weeds to grow underneath. Its tubers are white and round and its waxy and white flesh is an acceptable quality of great value in the Indian household. *Kufri Kisan* shows some resistance to viruses X, Y and A but is susceptible to leaf roll. It also shows slight field resistance to late blight.

8. *Kufri Kumar*: A late maturing hybrid with white, oval tubers. Its main characteristic is that it is highly field resistant to late blight and gives a heavy crop both in the hills and the plains during blight epidemics. This hybrid has given excellent performance in Assam hills where blight annually occurs in severe form.

9. *Kufri Neela*: A medium late hybrid with round and white tubers. It is highly field resistant to late blight and gives heavy yields in the Nilgiris where it out-yielded Great Scot in trials. It has found favours due to its resistance to late blight, in the Nilgiris Hills.

B. Varieties Which Are Being Released Shortly

1. *Hybrid C.I.*: A medium late hybrid giving excellent crops in the hills and the plains. It has white round tubers and shows moderate resistance to late blight. It shows some degree of resistance to late degeneration diseases. It is suitable as a main crop variety in the plains.

2. *Hybrid C.2*: A high yielding hybrid both in the plains and hills with medium-late maturity, produces a large number of uniform,

medium-sized red tubers, does not degenerate as rapidly as Kufri Red; suitable as a main crop variety in the plains of North India.

3. *Hybrid C. 140 (Kufri Sindhuri)*: A heavy yielding hybrid with red, round tubers, and medium maturity producing larger sized tuber than Kufri Red, has food storage ability and good culinary qualities, it possesses some resistance to mosaic group of viruses; suitable as a main crop variety in the plains of Uttar Pradesh, Bihar and West Bengal.

4. *Hybrid A. 2708*. An early maturing hybrid with attractive, oval, white tubers, its seed stocks do not degenerate as rapidly as those of Up-to-Date and therefore superior in yield to Up-to-Date over a number of years, suitable as an early variety in the plains of North India.

5. *Hybrid O.N. 1202*: A late maturing hybrid with round white tubers, suitable as a main crop variety in the plains of Uttar Pradesh; possesses a good keeping quality and does not degenerate rapidly.

APPENDEIX V

(Vide para 11)

Varietal Position in the States

State	Present Varietal Position				
Assam	Early—Up-to-Date, Arran Consul	Medium—Kufri Kumar			
Bihar	Early—Up-to-Date, Kufri Kuber, Satha	Medium—Darjeeling Red Round, Kufri Red			
	Late—Phulwa				
Madhya Pradesh	Early—Up-to-Date	Medium—Darjeeling Red Round			
	Late—Phulwa				
Maharashtra	Early—Up-to-Date, Kufri Kuber				
Madras	Early—Great Scot	Medium—President, Kufri Neela			
Orissa	Early—Up-to-Date	Medium—Darjeeling Red Round			
Punjab	Early—Up-to-Date, Criags Defiance	Medium—Kufri Red			
Uttar Pradesh	Early—Up-to-Date, Kufri Kuber	Medium—Kufri Red, Kufri Kundan			
	Late—Kufri Kisan, Phulwa				
West Bengal	Early—Up-to-Date	Medium—Darjeeling Red Round			
Mysore	Early—Up-to-Date				

Note:—Originally in India 26 varieties were grown to a larger or smaller extent. The number of varieties now grown is 14. New varieties have replaced the older unproductive types such as Gola, Hellora, Satha etc. while older varieties like Darjeeling Red Round are also being replaced by improved variety Kufri Red. A few more improved varieties like Kufri Sindhuri, A.2706 and C.2 are under national trials and will be soon released for commercial culture.

APPENDIX VI

Summary of Conclusions/Recommendations contained in the Report

S. No.	Reference to para No. of the Report.	Summary of conclusions/recommendations.
1	2	3
1	7	The Committee suggest that the schemes included in the Plan should be properly phased and expeditiously finalised in order to ensure that the objectives underlying the Plan provision are achieved. If Rs. 67 lakhs, proposed to be provided in the Fourth Plan, are to be put to good use, the Committee would suggest that detailed schemes should be drawn up in the earlier part of the Plan period so that these can be implemented in accordance with the phased programme.
2	8	The Primary need in India is of increasing the food resources. Since potato is a nourishing and adaptable subsidiary food, it presents an attractive source for augmenting food resources. The Committee would like the Central/State Governments to approach the problem of increasing potato production from this angle of national importance and to adopt a phased programme of increasing its production.
3	10	The yield of potato per hectare is the lowest in India. The Committee note that the yield, for the last 12 years has been more or less stagnant. The Committee consider this to be a failure to fulfil the main objective for which the Institute was set up. The Committee suggest that the Institute should devise a coordinated programme for increasing yield of potato per hectare. Such a programme should <i>inter alia</i> provide for supply of disease-free potato seeds, fertilisers, insecticides and pesticides, etc. Provision of ancillary services such as storage, marketing and credit may also be ensured.
4	13	The Committee regret that even in the fourth year of the Third Plan, the Government and the Institute have not been able to make the States interested

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in taking up the implementation of the Scheme for production, inspection and certification of disease-free seeds which was included in the Third plan. The Committee consider that research should not be divorced from its practical application in the country. If the valuable materials and techniques developed at the Institute after years of concentrated research are not to be relegated to a research pigeon-hole but to be put to effective use in the field, it is patent that the role of the Institute should not only be that of a leader in research but it should also have a role to play in the actual cultivation. The Committee are aware that the question of providing any exclusive extension wing for a particular research institute is linked with the broader problem of the role and functions of the Indian Council of Agricultural Research, Directorate of Extension and the State Agricultural Organisations. The Committee would suggest that a high powered committee may be constituted urgently to go into the matter in all its ramifications and evolve a solution which would provide an effective and purposeful link between the research institutes and the tiller of the soil so that the results of research come to the aid of the nation in these pressing times of food scarcity.

5 14 Inview of the fact that the total area available for the production of seed potatoes in the hills is limited and that the scattered nature of the available area also presents several problems such as transport, timely supply of seeds, etc., the Committee recommend that the seed plot technique should be made use of to the maximum extent possible so as to saturate the entire potato area of the country with seed potatoes in the phased programme of five years.

6 15 The Committee note with concern that the production of foundation seed stocks at the farms of the Institute has been progressively decreasing. The Committee further note with regret that the total quantities of the foundation seeds produced at the Institute's farms and healthy seeds produced at the regional stations are not distributed fully to the States for further multiplication. The Committee need hardly emphasise that the Institute should have made proper arrangements to distribute all the healthy seeds proper at the farms of the Institute and regional stations to the States and progressive farmers.

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The Committee, however, expect that necessary remedial steps in this regard would be taken without any delay.

7 18 The Committee regret to note that Government have not given serious consideration to the suggestions made by the First Tuber Crops Committee (1959) and the Committee on Achievement Audit (1960) for introduction of diploma course on a permanent footing to train personnel of State Departments of Agriculture and Agricultural Extension Officers of Development Blocks which is one of the main functions of the Institute. The Committee recommend that decision on the scheme submitted by the Institute should be expedited.

8 20 The production, certification and grading of potatoes is a highly technical job and as such suitably trained and experienced hands will be required to tackle the day to day problems. The Committee recommend that the training facilities available at the Central Potato Research Institute should be fully made use of for training the technical staff of the State Departments of Agriculture, and also of the Agricultural Extension Officers of the Development Blocks.

9 26 As the yield of potato in India is almost the lowest in the world and it is not precisely known as to what extent among other factors, the yield is depressed by pests and diseases, the Committee suggest that the Institute should undertake a study to ascertain the incidence of diseases and pests in potato cultivation and take necessary preventive steps.

The Committee also suggest that effective control of blight disease and a correct method of forecasting the disease should be evolved in collaboration with the Indian Meteorological Department.

10 27 The Committee suggest that in order to prevent spread of pests and diseases through imported seed potatoes, the need for a proper control on the import of seed potatoes may be impressed on all the States.

11 28 The Committee recommend that as the plant protection chemicals are essential for the success of the potato crop, all efforts should be made to produce these

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chemicals in sufficient quantities indigenously to meet the increasing demands of the cultivators. The Committee suggest that the matter may be taken up with the Hindustan Insecticides Ltd.

12 29 The Committee are glad to note that anti-sera for common virus diseases have been developed at the Institute. The Committee suggest that the possibility of commercial exploitation of anti-sera through the National Research Development Corporation may be explored.

13 30 The Committee consider that the distribution of pure seed potatoes free from virus and other diseases is of paramount importance, if production of potatoes has to be augmented. The Committee are concerned to note that so far no machinery has been set up for grading of seed potatoes and the question of evolving suitable standards of purity has yet to be finalised in consultation with the States. The Committee cannot too strongly urge the need for grading seed potatoes according to standards of purity to be laid down by the Indian Standards Institution before distributing the same to the farmers. The committee suggest that energetic steps may be taken to pursue the matter and finalise the standards of purity as expeditiously as possible.

14 31 The Committee feel that the research on technological aspects of the potato crops should be kept out from the programmes of the Institute and that the technological research on potato can be suitably carried out by the Central Food Technological Research Institute in collaboration with Central Potato Research Institute as suggested by the Committee on Achievement Audit. The Committee hope that Government will take an early decision on this matter which is pending since 1960.

15 33 The Committee suggest that the Central Potato Research Institute should compile accurate information on the Indian commercial varieties which can replace, with advantage, the imported varieties and disseminate such information to the Departments of Agriculture

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of States for the benefit of traders who have a preference for the imported potato seeds. The Committee further suggest that Government should have a phased programme of curtailing and finally stopping imports of potato seeds.

16 34 The Committee are surprised that the price of indigenous seeds is 60 per cent higher than that of the imported seeds. The Committee would like to invite attention of Government to the recommendation contained in para 14 of the Report and further recommend that urgent steps should be taken to bring down the cost of indigenous potato seeds so that the cost of seeds may not exceed 25% at most of the total cost of cultivation.

17 35 The Committee regret that in spite of the very clear recommendation of the Rural Credit Survey in 1951 that warehousing facilities are to be created only through three agencies—the Central Government, State Governments, and the co-operative organisations—and whenever necessary also to be financed and subsidised by the Government, there have been no attempts to set up a chain of warehouses for storage of agricultural products for the benefit of the producers and there have been so much indiscriminate sanctions of private cold storages that these have now become more an instrument of cornering of goods and pushing up of prices rather than of giving the expected benefits to the actual producers. The Committee recommend that to eliminate the inordinate rise in prices of potato seeds, a phased programme should be taken up for setting up of cold storage within the control of the Government under the Warehousing Corporation Act or through producers' co-operative societies. Government should also restrict the issue of indiscriminate licences to private parties for opening of cold storage houses, to avoid undue rise in prices of vital agricultural products like potato seeds.

18 36 The Committee recommend that the scheme for research on cold storage and maintenance of seed stocks and cultures under healthy conditions should be expeditiously executed and the results disseminated to the organisations manning cold storage plants.

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19 37 The Committee welcome the idea of setting up an International Germ Plasm Bank and hope that Government would pursue the matter further.

20 38 The Committee need hardly stress that the Reports of the Institute should be published regularly within six months of the close of the year, if they are to be of any practical use to the scientists and others interested in the subject.

21 39 The Committee urge that the Institute should display the same zeal in purveying scientific data to the farming community which the scientists do in their laboratories.

APPENDIX VII

Analysis of Conclusions Recommendations contained in the Report.

I. CLASSIFICATIONS OF RECOMMENDATIONS :

- A. *Recommendations for improving the Organisation and working :*
Serial Nos. 1, 3, 4, 5, 6, 7, 8, 9, 18, 20 and 21.
- B. *Recommendations for effecting economy :*
Serial Nos. 14 and 16.
- C. *Miscellaneous Recommendations :*
Serial Nos. 2, 10, 11, 12, 13, 15, 17 and 19.

II. ANALYSIS OF MORE IMPORTANT RECOMMENDATIONS DIRECTED TOWARDS ECONOMY :

Serial No. as per Summary of Re- commendations Appendix VI	Particulars
14	Research on technological aspects should be kept out from the programme of the Central Potato Research Institute.
16	Urgent steps should be taken to bring down the cost of indigenous potato seeds.
