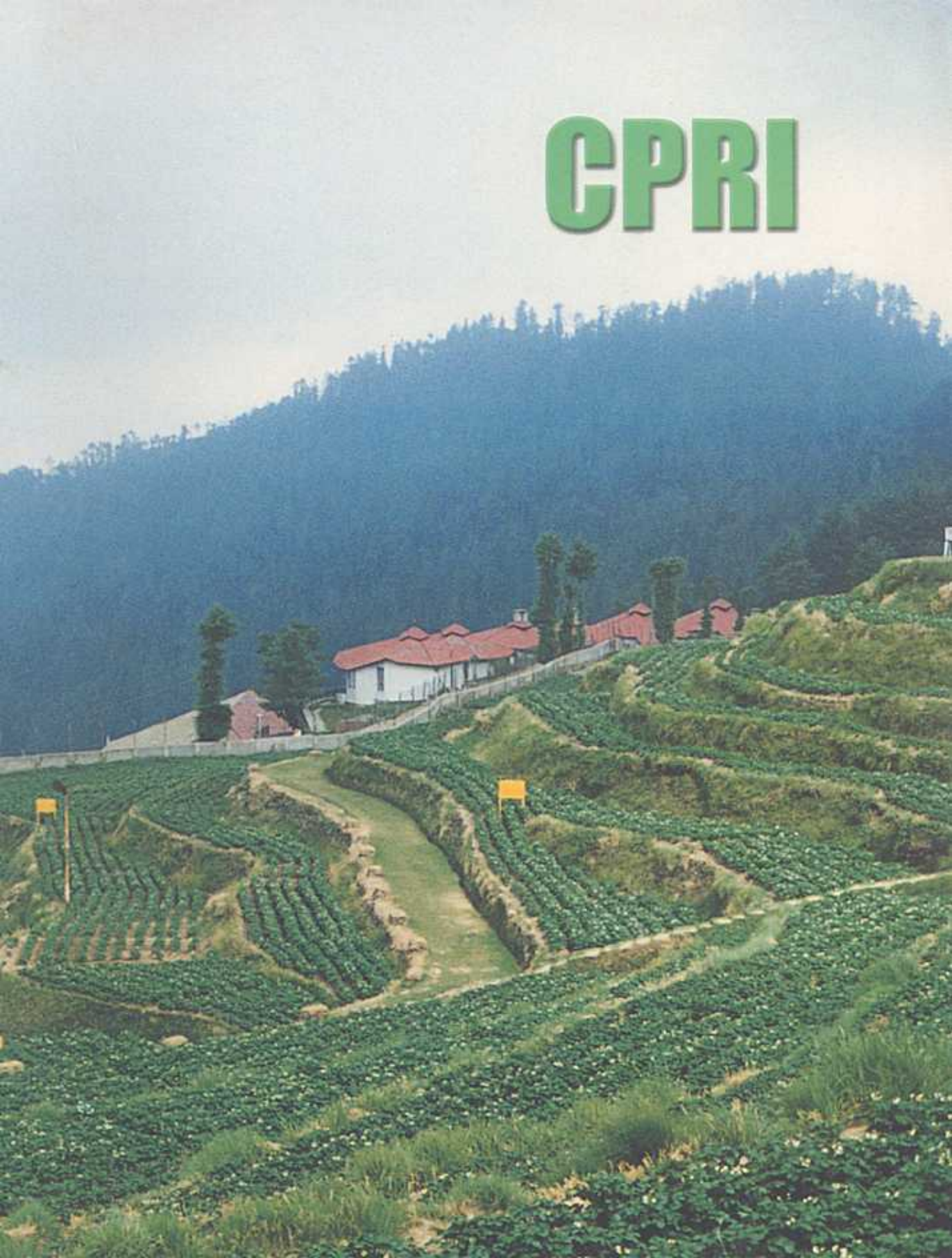
CPRI



What Eminent Scientists Think of the Potato

Dr MS Swaminathan
Chairman
MS Swaminathan Research Foundation,
Chennai, India

The present vulnerability of National food budgets to the vagaries of weather arises from our dependence on too few crops for our daily bread. Potato can help to widen the food supply base and thereby help to minimize the risk of serious food shortages in the tropics and sub-tropics.

Considering the widespread under-nutrition in the country, there is a need for popularising the consumption of potato on a larger scale.

Dr MS Swaminathan and Dr RL Sawyer

With co-ordination of research effort and concentration on the priority factors which have until now limited the use of the potato, the potato will take its proper place as a world food by the year 2000.

Dr RL Sawyer
Former DG, CIP
Lima, Peru

If one had to live on one food alone, the potato would be better by far than any other major food crop available today.

Dr WG Burton
Eminent Potato Physiologist, UK

It is a reasonable approximation to state that the nutritive value of the produce from a hectare of potatoes would have been about three times as great as that from a hectare of cereals.

The Potato

The potato ranks fourth in production after wheat, rice and maize in the world and also in India. It is one of the most important food crops in the world. It is an efficient food producer and has the potential to become a supplementary staple food in the developing world where ever-increasing population is to be fed through shrinking land resources. The potato is a wholesome food containing carbohydrates, proteins, minerals and vitamins. The protein quality is comparable to egg and milk protein and is superior to vegetables, pulses and cereals. It is a non-fattening food provided it is consumed unfried. Potato is grown throughout the year in one or the other part of India. In 1996-97 India emerged as third largest producer of potato in the world with a total production of 25 million tonnes and an average yield of 19.2 tonnes per ha.

India Needed Indigenous Technology

Potato is a native of high Andes of South America. It was introduced into India from Europe. In Europe and North America, the potato is grown as a summer crop with an average duration of 120 to 180 days. The days are long with average sunlight of 14 hrs. The day and night temperatures do not fluctuate very much. The crop is planted, harvested and stored under cool temperatures. In India about 93 per cent of potatoes are grown in sub-tropical plains and plateau during winter months (October to January). The crop duration ranges from 60 to 90 days. Day length is on an average of 10 hrs only. The night temperatures become chilly and the day temperatures are high in the range of 25° to 30°C. Frost is a common phenomenon in many areas. Crop is planted, harvested and stored during

Potato Cropping Flexibility

Potato can be grown as mixed, inter, relay or sequential crop. It is grown in kharif (plateau), early autumn, main rabi and spring (plains and hills), summer (hills) and all the year round (eastern low hills and southern hills). Can be harvested 60 days after planting or allowed to grow for 100-110 days depending on the cropping system. Most of the potato- based crop sequences are more remunerative.

high temperatures which range between 30° to 48°C. The climatic conditions under which potatoes are grown in India are thus, entirely different to those under which potatoes are grown in Europe and North America. Therefore, India needed to have its own potato varieties and production technology befitting its climatic conditions.

CPRI : Dream Comes True

An idea was conceived, after realising the importance of potato in the food economy, to set up a full-fledged Institute for potato research in India. Potato research in India formally began on April 1, 1935 with the opening of a Potato Breeding Station at Shimla and two seed production farms at Bhowali (Kumaon hills, UP) and Kufri (Shimla hills, HP) as a part of the Indian (then, Imperial) Agricultural Research Institute, Delhi. In 1945, a scheme for the establishment of a Central Potato Research Institute (CPRI) was drawn up under the guidance of the then Agricultural Advisor to the Government of India, Sir Herbert Steward. Dr. S Ramanujam, who was then working as an Economic Botanist at the IARI, was appointed as an Officer on Special Duty for implementing the scheme in 1946. It took more than three years for the scheme to attain concrete shape in the form of the Central Potato Research Institute at Patna in August, 1949. The Government of Bihar provided a 10 ha piece of land with an old single storey barrack-type building. Dr. S. Ramanujam took over as the first Director. Three small units under the IARI looking after potato, namely Potato Breeding Station at Shimla, Seed Certification Station at Kufri and Potato Multiplication Station at Bhowali were merged with the newly-created Central Potato Research Institute. The headquarters was shifted from Patna to Shimla in 1956 because the hills were the only source of disease free seed and ideal location for hybridisation. All potato genotypes flower under long days of the hills and, therefore, more genotypes could be used for breeding new varieties. Also, with the technology known at that time, potato genotypes/hybrids/varieties could be kept disease free only in high hills. In 1971, All India Coordinated Potato Improvement Project (AICPIP) was started by the Indian Council of Agricultural Research (ICAR) with headquarters at the CPRI, Shimla and a network of centres at State Agricultural Universities (SAUs) and in the CPRI regional stations. At present, the AICPIP has 23 centres all over India.

The Mandate of CPRI

To undertake basic and strategic research for developing technologies to enhance productivity and utilisation of potato.

To produce disease-free basic seed of different notified varieties developed by the institute.

To act as national repository of scientific information relevant to potato.

To provide leadership and co-ordinate network research with state agricultural universities for generating location and variety-specific technologies and for solving area-specific problems of potato production.

To collaborate with national and international agencies in achieving the objectives.

To act as a centre for training in research methodologies and technology for up-grading scientific manpower in modern technologies for potato production.

To provide consultancy in potato research and development.

Central Potato Research Institute, AICPIP and Their Research Centres

DG, ICAR

DDG (Hort)

DIRECTOR, CPRI

DIVISION / SECTION	RESEARCH STATION	P C, AICPIP
Administration	Kufri (HP)	Babugarh (UP)
Finance & Accts	Modipuram (UP)	Bhubneswar (Orissa)
Crop Improvement	Jalandhar (Punjab)	Chhindwara (MP)
Crop Physiol.& Biochemistry	Patna (Bihar)	Deesa (Gujarat)
Crop Production	Shillong (Meghalaya)	Dharwad (Karnataka)
Plant Pathology	Gwalior (MP)	Dholi (Bihar)
Entomology & Nematology	Ootacamund (TN)	Faizabad (UP)
Seed Technology	Rajgurunagar (MS)	Hassan (Karnataka)
Post-harvest Techn.		Hisar (Haryana)
Social Sciences		Jalandhar (Punjab)
Lib.& Documentation		Jorhat (Assam)
		Kalyani (WB)
		Kota (Rajasthan)
		Kufri (HP)
		Modipuram (UP)
		Ootacamund (TN)
		Panninagar (UP)
		Patna (Bihar)
		Raipur (MP)
		Rajgurunagar (Maharashtra)
		Ranichauri (UP)
		Shillong (Meghalaya)
		Srinagar (J&K)

MANPOWER BEHIND POTATO

CATEGORY	CPRI	AICRP
SCIENTIFIC	113	59
TECHNICAL	243	55
ADMINISTRATIVE	131	09
SUPPORTING	236	11

(As on August, 1999)

Indian Potato Research Network

The CPRI, in addition to its headquarters, has regional stations located in different agro-ecological potato-growing zones. These stations assist the Institute in carrying out multi-locational research of national importance and also address regional problems. Varieties/technologies developed by the CPRI are tested at 23 centres of All India Coordinated Potato Improvement Project located in State Agricultural Universities (SAUs).

Varieties and technologies which prove the best in these multi-locational trials are recommended for release for the use of farmers. The potato, thus, has a well-knitted and a broad network and also has an element of testing of varieties and technologies independently by third party organisations like SAUs. This system ensures that only those technologies and varieties which are good are recommended. The regional stations of the CPRI and their functions are given below :

1. CPRI Campus – Central Potato Research Station, Modipuram (UP)

The station is located in the North-western plains. This is the second campus of the Institute. It has 154 ha of farm area and 45 scientists representing all disciplines. It is the main centre for potato research relating to the sub-tropical plains and covers research on all aspects of potato, including seed production, extension programmes and trainings. The major thrust areas at the station are potato processing, post-harvest technology, agronomical research including cropping systems, nutrient and water management, TPS technology and breeders' seed production.

2. Central Potato Research Station, Jalandhar (Punjab)

The station is located in the North-western plains. The station carries out research relating to breeding for earliness, nutrient management including micronutrients, cropping systems, integrated management of diseases and pests, seed production and development of implements for mechanization of potato cultivation. The station also maintains germplasm of *Solanum tuberosum* sub sp. andigena.

3. Central Potato Research Station, Sahaynagar, Patna (Bihar)

The station is located in the Eastern plains having relatively moderate winter. It carries out research on all aspects of potato. The thrust areas are post-harvest technology, TPS technology, potato-based cropping system and integrated management of diseases and pests. The station also produces breeders' seed of potato and carries out transfer of technology programmes including training programmes.

4. Central Potato Research Station, Gwalior (MP)

The station is located in the Central plains. It has the largest farm area of 179.5 ha and is primarily engaged in breeders' seed production. The station has two research programmes namely, development of low-input technology for potato production and to work on stem necrosis diseases of potato.

5. Central Potato Research Station, Kufri-Fagu, Shimla (HP)

The station is located in the North-western Himalayan hills. It has two units one for potato nucleus seed production and another for breeders' seed production. The third unit carries out hybridization to cater to all the breeding programmes of the Institute, evaluation of hybrids and research on agronomical aspects and late blight.

6. Central Potato Research Station, Shillong, (Meghalaya)

The station is located in the North-eastern Himalayan hills. The main programmes are screening of germplasm and hybrids for resistance to late blight, integrated management of late blight, bacterial wilt, and potato tuber moth, and development of production technology and varieties for the eastern hills.

7. Central Potato Research Station, Muthorai, Udagamandalam (Tamil Nadu)

The station is located in the tropical hills in Southern India. The programmes at the station are development of agro-techniques for potato cultivation, development of varieties possessing combined resistance to late blight and cyst nematode and to develop control measures for late blight, cyst nematodes bacterial wilt and other soil and tuber- borne diseases.

8. Central Potato Research Station, Rajgurunagar, Pune (Maharashtra)

The station is located in the Peninsular India where potato is grown in rainy and winter season. The programmes at the station include selection of improved hybrids, cropping system and plant protection.

Always Ahead In Achievements

As a result of research, seed production and transfer of technology work done by the CPRI, India has emerged as world leader in the subtropical potato cultivation. The salient achievements of the CPRI are given below:

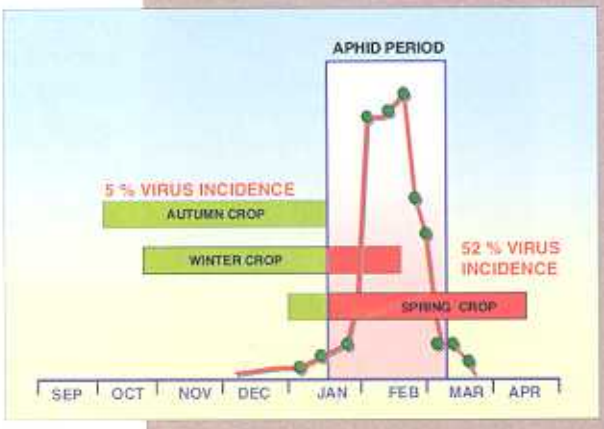
■ The potato germplasm collection at the CPRI presently has about 1200 accessions of *Solanum tuberosum* ssp. Tuberosum, 1000 accessions of *Solanum tuberosum* ssp. Andigena, and more than 200 accessions of wild and semi-cultivated species.

■ India is the only South Asian country to have its own potato breeding programme. The programme is exclusively implemented by the CPRI and has yielded 35 high-yielding cultivars of different cropping durations and possessing resistance to major diseases like late blight, wart, cyst nematodes and tolerance to viruses. These varieties provided choice to the Indian farmers to adjust durations of potato crop anywhere in the range of 60 to 100 days. The short, medium and long duration varieties enabled potato to fit into several multiple and intercropping systems. About 93 per cent of the potato area in the country is under improved cultivars.

■ A major breakthrough in potato seed production was achieved with the development of Seed Production Technology for the subtropics, which involves growing of seed crop during zero or low aphid (an insect that spreads potato virus diseases) period in the North Indian plains. A national disease-free seed production programme for hills and plains was set up utilising these low-aphid periods. This programme produces about 2600 tonnes of breeders' seed annually, which is sufficient for the country's requirement if multiplied and utilised properly.

Resource Generation

Revolving Fund Scheme for breeders' seed production, was started in 1991-92 with a seed money of Rs. 4.00 million. It has generated about Rs. 108.00 million upto the end of 1998-99 (in 8 years) through sale of breeders' seed. During 1998-99, the receipts under RFS were Rs. 27.58 million, other receipts were Rs.6.00 million totalling Rs.33.58 million. Expenditure during the same period was Rs. 115.03 million (under Plan and Non-plan). Thus, the receipts were about 30 per cent of the total budget expenditure.



SEED POTATO TO SAVE FOREIGN EXCHANGE

Our neighbouring countries continue to import potatoes from Europe. CPRI produces 2,600 tonnes of basic seed annually, and supplies 2000 tonnes to State Departments of Agriculture / Horticulture for further multiplication in three stages viz. Foundation I, Foundation II and Certified seed. The indigenous seed production system is saving the country at least US $ equivalent to Rs. 17424 million annually. The indigeneously produced seed is available to the farmers @ Rs. 5000-7000 i.e. US $ 139 to 194 per tonne as against US$1120-1200/tonne in neighbouring countries.

- Based on several years of multi-location trials, agro-climatic zone wise package of practices for seed and ware potato production, nutrient management and crop protection were developed which have contributed to increased potato production and productivity in the country.

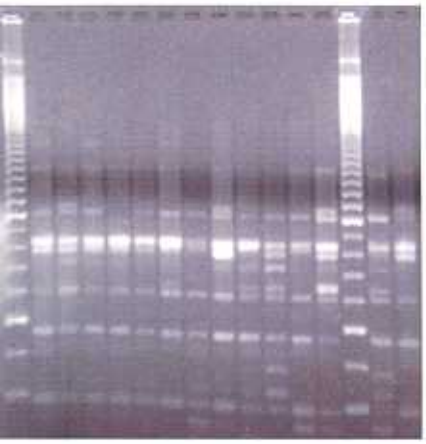
- Identified profitable potato-based cropping systems in different agro-climates, including inter-cropping of the potato with sugarcane and wheat, and worked out optimal schedules for weed management and fertilizer and manure application.

- Developed implements for mechanising potato cultivation, including an oscillating tray-type potato grader, fertilizer applicator-cum-line marker, potato culti-ridger, soil crust breakers, granular insecticide applicator, potato digger and potato planter.

- A late blight forecasting system has been developed to warn the farmers of the hills and North-western plains 7-10 days in advance for taking plant protection measures.

■ Developed methods of screening for high thermo-period resistance and used them to select heat-resistant lines.

■ Standardised protocols for micropropagation of Indian potato cultivars. Micro-tubers of various varieties are produced in tissue culture, multiplied in net houses and the produce is planted in field. This technology has proved feasible to augment seed production. The Institute is producing 40,000 to 60,000 micro-tubers per year.



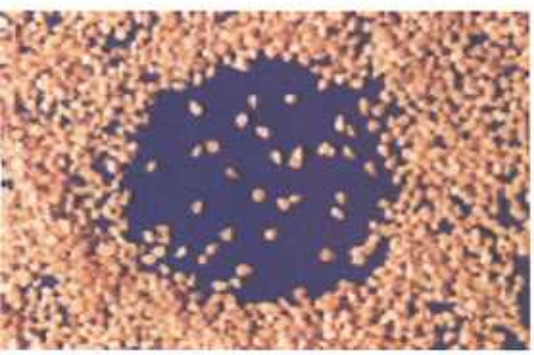
■ DNA fingerprinting of all the 34 improved potato cultivars was completed using Simple Sequence Repeat (SSR)/ Microsatellite technique. DNA fingerprinting of 18 cultivars was also done using RAPD (Randomly Amplified Polymorphic DNA) technique.

■ Developed ELISA variants, and improved immunosorbent electron microscopic techniques for detection of potato viruses and cDNA probes for viroid detection.

■ Vitrification-based cryopreservation of potato shoot tips has been developed as an efficient strategy for long-term conservation of potato germplasm.

■ Transferred Cry-1Ab gene in Indian potato cultivars to provide resistance to Potato Tuber Moth. Nine resistant transgenic lines have been selected in glass house trials.

■ An innovative research finding of the Institute is development of technique for raising a commercial crop of potato by using botanical seed of potato or true potato seed (TPS). Instead of 2.5 to 3 tonnes of tuber seed required for planting one hectare, only 200 gm of TPS is sufficient to raise a crop of potato, which would substantially increase availability of table potatoes.



CPRI is the first institute, among plant science research institutes of India to introduce, in 1984, the use of ELISA and in 1987 immunospecific electron microscopy and there has been a quantum jump in the development and adoption of methods of detecting and eliminating viruses.

■ Carried out basic studies on photosynthesis and its relationship with tuber yields which generated new information on inter-genotypic, leaf age dependent, seasonal and diurnal variations in photosynthetic rate and its modification by leaf water deficits and light intensity.

■ Established relationship between tuber dry matter content and specific gravity for different cultivars in five agro-climatic zones, and identified areas for producing high dry matter and low reducing sugar potatoes suitable for processing. Studied sugar accumulation in potatoes stored at different temperatures and identified genotypes that accumulated less reducing sugars.

■ Demonstrated the efficiency of chemical control of sprouting during non-refrigerated storage and the feasibility of on-farm storage of potatoes in the western part of the North Indian plains for 3-4 months in an insulated potato store equipped with passive evaporative cooling.

■ Studied morphological, anatomical, and physiological tuber characteristics in relation to keeping quality under refrigerated storage and identified characteristics associated with good keeping quality.

■ Developed efficient methods of testing soils and plant tissues for identifying nutrient deficiencies.

■ Developed a user-friendly computer programme ivCMS Version 2.0 for day-to-day management of an active *in vitro* repository of potato germplasm.

■ Demonstrated that an *Azotobacter* strain can partially supplement the nitrogen requirement of the potato crop in the field.

■ Collected and maintained country-wide statistics on potato production, area, yields, prices, and prepared annual Quick National Outlook Surveys for estimating potato production and prices.

■ Established second largest potato library in the world, which currently has about 42,000 documents and subscribes to about 470 current periodicals and world-wide CDROM agriculture databases (CABI, AGRIS & AGRICOLA). Computerised database of Indian potato literature of past one hundred years has been also created by the library.

CPRI-THE BEST INSTITUTION

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
BEST INSTITUTION AWARDS
1995
CITATION

The Best Institution Award for the year 1995 is bestowed upon the Central Potato Research Institute for its **pioneering research work in developing high yielding pest resistant, short duration potato varieties, developing low input technologies, and feasible potato based cropping systems for different parts of the country.**

The CPRI through its effective multi-disciplinary approach has developed 5 new potato varieties during the last decade which are resistant to late blight, cyst nematode/wart disease besides being high yielding and of short-medium duration. The Institute has perfected a low investment-high return production technology based on true potato seed. Profitable and feasible potato-based cropping systems have improved the fertilizer economy, increased cropping intensity to 200-400%, improved the maintenance of soil fertility and reduced the incidence of diseases and pests.

The CPRI has well **established and highly efficient Breeders' Seed Production Programme to meet the national demand.** It has already achieved the target of 2500 tonnes of annual production of Breeders' seed set up by the National Commission on Agriculture for the year 2000. The latest diagnostic techniques have been perfected and the newer areas of disease free seed production identified. **The Institute has been generating funds to the tune of 30 per cent of its annual budget mainly through the Breeders' Seed Production Programme of Potato.**

As a result of the concerted and systematic research efforts, excellent team work and with efficient management of the Institute, India has witnessed 73 per cent increase in the production and 35.1 per cent increase in productivity of potato during the last decade. During 1995 the average yield per hectare was 16 metric tonnes while the production was 18 million metric tonnes of potato.

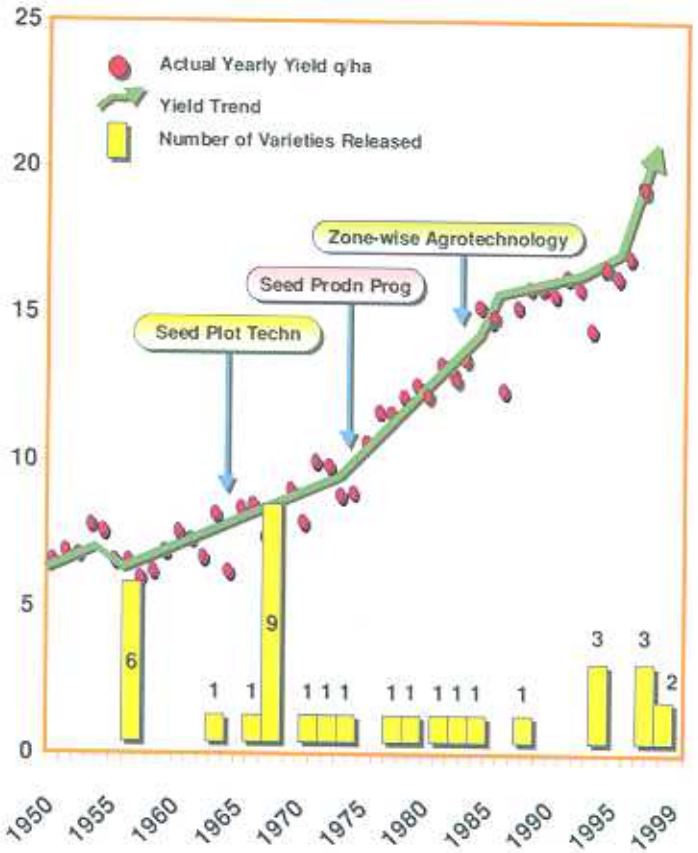
The Central Potato Research Institute was established at Patna in 1949 and was shifted to its present location at Shimla during 1956.

Impact of Indigenous Technologies

Potato production in India in 1998-99 (estimated) was 23.0 million tonnes from 1.30 million ha, i.e. an average yield of 18.3 t/ha. This can be compared to 1949-50, the year of establishment of the CPRI, when the production was 1.54 million tonnes, the area 0.234 million ha and the average yield 6.59 t/ha. As a result of indigenous potato varieties and production technologies, India ranks fourth in production, third in area as per 1997 data.

During the five decades 1949-50-1997-98 the growth rates of production, area and average yields of potato in India increased by 13.0, 5.2 and 2.2 times respectively. The 5.96 per cent annual increase in potato production can be compared to 5.50 per cent for wheat, 2.77 per cent for rice and 2.72 per cent for total foodgrains for the same period. The yield increase per hectare of potato during this period has also been better than in all foodgrain crops except for wheat. The ACGR for increase in production, area and average yield of the potato in the world during the period have been 0.64 per cent, -0.06 per cent and 0.70 per cent respectively. It can thus be seen that the potato has been established as one of the major food crops in India.

IMPACT OF IMPROVED VARIETIES AND TECHNOLOGIES ON POTATO PRODUCTION



Per cent fund allocation for research in relation to net value of output of potato

Plan	Period	Value of output (Rs crores)	Allocation for research* (Rs crores)	Receipts generated (Rs crores)	Net allocation (Rs crores) (4-5)	per cent of value spent for research
V	1974-75 to 1978-79	2325	5.47	1.13	4.34	0.18
VI	1980-81 to 1984-85	4514	9.83	1.87	7.96	0.17
VII	1985-86 to 1989-90	8335	15.10	2.79	12.31	0.14
VIII	1992-93 to 1996-97	17152	34.68	7.49	27.19	0.15
Total		32326	65.08	13.28	51.8	0.16

* Value of output of potato after deducting cost of cultivation etc.

Source : National Accounts Statistics, Central Statistical Organisation, Govt. of India, New Delhi

Brown Revolution for Bumper Potato Production in Next Millennium

Potato is a high-yielding, nutritious, and short-duration crop. In a country like India with large population to feed and shortage of arable land, potato is perhaps one of the best answers to meet the growing food needs. Besides, the crop has great potential to generate rural employment and income. Potato has high employment generation potential during crop raising, post-harvest handling, and processing. In India, potato can be grown throughout the year in one part or the other. Its adaptability is so wide that traditional agricultural seasons do not restrict its cultivation. In fact, it can grow and give economic returns under any climate, provided the night temperatures during tuberization remain between 16°-22° C.

The potato breeding programme in India has been a great success comparable or even better than any of the Green Revolution crops. When we look back at the last five decades we can see that the potato has made considerable progress as a result of the establishment of a national disease-free seed-production programme, conventional breeding for high yields and adaptability of improved varieties to diverse agro-climates, and the development of agro-techniques. Nevertheless, the following problems need urgent attention in view of the changed scenario.

1. Only a part of the genetic variability available in the potato has been exploited for improving potato varieties. Free access to plant genetic resources could itself be impeded in the future. Thus, the strengthening of existing germplasm resources and their better utilisation for incorporating a wider genetic base into our future varieties are not options but compulsions for the future.
2. Although potato is basically a temperate crop, wide variability in adaptation to high thermo-periods is available in the gene pool. There is a need to develop varieties and agro-techniques that would enable the extension of potato cultivation in non-traditional areas and seasons.

ENVIRONMENT-FREINDLY INTEGRATED PACKAGE

The CPRI is one of the first institutes in the Asia to develop an environment-friendly integrated package for controlling soil and tuber borne diseases of potato. With the intensive cultivation of seed and ware potatoes, soil and tuber borne diseases like black scurf, common scab, and dry rot became problems. Their incidence increased beyond the permissible limits prescribed for seed potatoes. The CPRI then developed tuber treatments with organomercurial compounds to control these diseases. Since the toxic and persistent nature of organomercurial compounds posed risks to the health of workers and to the environment in general, scientists at the CPRI looked for environment-friendly alternatives, which led to the development of tuber treatment with 3 per cent boric acid. In addition to killing the pathogens, the boric acid was found to encourage the growth of a mycoparasite which inhibited the growth of pathogens making it a combination of biocontrol and safe chemical treatment.

3. In the light of the increased demand for processing varieties, genotypes with high tuber dry matter and accumulating low reducing sugars during storage need to be developed.
4. Similarly, to reduce dependence on energy intensive refrigerated storage and to avoid sweetening and consequent deterioration of tuber quality that occurs under refrigeration, there is a need to develop varieties with good keeping quality.
5. More emphasis needs to be placed on basic research, particularly in the fields of molecular biology and genetic engineering.
6. Low-input, sustainable and environment-friendly agro-techniques which reduce dependence on chemical fertilizers, toxic chemicals and systemic insecticides, etc., need to be developed.

Potato As The Only Non-Cereal Major Food Crop

Potato is an ideal food crop. It is highly efficient in converting sunlight into nutritious food. It produces the highest amount of food dry matter, protein and other nutrients per unit area per unit time, among all the major food crops. It is also nutritionally superior to the traditional food crops. In addition, it is widely adaptable and also has great potential for yield increase by genetic manipulation. Therefore, with the limiting arable land resources and increasing population, potato is likely to play a major role in meeting the food requirements. Development of processed potato products with long shelf-life can go a long way in increasing potato consumption in India.

Training Programmes

The Institute has been holding following training courses for field functionaries of state Departments and scientists of SAUs and other in-service staff of various developmental organisations:

- Modern methods in potato production
- Potato seed production and certification
- True potato seed production and commercial utilisation
- Potato research methodology
- Tissue culture techniques
- Plant protection
- Post-harvest technology
- Group training in any field of potato on request
- Farmers' day and *Gosthis*, etc

Educational facilities

The Institute headquarters at Shimla and regional campus at Modipuram are approved centres for Doctoral research of the Himachal Pradesh University and Meerut University, respectively.

Potato Technology For All

■ Transferred potato technology under Lab-to-Land, ORP, TAD and other programmes, and used innovative extension techniques like *Potato School on* AIR, along with impact assessment and constraint analysis of adoption of improved technology. The average yield of potato obtained in these demonstrations was 253 q/ha which was much higher as compared to local average yield (176 q/ha.). Through HRDP, 1918 farmers and 3000 field functionaries and scientists (including 150 from South Asian Countries) were trained through Institutional/non-peripatetic courses.

■ Technology Assessment and Refinement (TAR) through Institute Village Linkage Programme (IVLP) was started in 1996 and operated in Patna District (Bihar) and Shimla District (HP) adopting 700 and 300 farm families respectively . In all 755 demonstrations were conducted under IVLP and on an average 27 to 30 per cent increase in yield of various crop enterprises were recorded in these demonstrations. Four thousand and forty farm families were adopted by the Institute and its stations in its various ToT programmes. An average of 40 to 50 per cent increase in productivity was achieved.

■ The Institute has developed a strong programme of production and distribution of technical, scientific and extension literature on potato covering all aspects and updating communication of latest research achievements to its intermediate and ultimate users. The Institute, has so far published 52 technical and 30 extension bulletins on all aspects of potato including economics-marketing, statistics, ToT aspects. The information dissemination through extension bulletins is a regular feature of the CPRI. The documentary films produced on different aspects of potato are another strong media support provided for communication of potato technology.

CPRI ON WORLD WEB SITE

Now you can know more about the CPRI from anywhere in the world. The Institute has launched its own website (URL: http://cpri.hp.nic.in). The linux operating system has been installed in the server and is working satisfactorily. The LAN has been established with this operating system and workstations in the Agricultural Research Information System (ARIS) cell of the Institute and Library. Arrangements are being made to provide internet and e-mail facilities to all divisions of the CPRI through LAN.

Linkages and Coordination

The National Potato Programme has linkages with sister Research & Development Institutions, State Agricultural Universities through All India Coordinated Potato Improvement Project, Ministry of Agriculture, Government of India, State Departments of Agriculture/Horticulture and NGOs concerned with potato improvement. Some of these organisations are:

Bayer India Ltd, New Delhi
Bhabha Atomic Research Centre, Mumbai
Deptartment of Biotechnology, New Delhi
FAO/IAEA, Vienna
Godrej Agrovet Ltd, Bombay
Hoechst Shering Agro Evo Ltd, Bombay
HP University, Shimla
ICI, UK & Monsanto, USA
Indian Agricultural Research Institute, New Delhi
Indian Institute of Spices Research, Calicut
IGNOU, Shimla
Indo-US-Sub Commission
International Potato Center, Lima, Peru
International Potato Improvement Programme, Mexico
Ministry of Agriculture Govt. of India
Jawahar Lal Nehru University, New Delhi
National Defence Science Organisation, Delhi
National Horticulture Board, Gurgaon
National Seeds Corporation, New Delhi
NCIPM, New Delhi
Pepsi Foods Ltd, New Delhi
Quality Tea Plantation Ltd, Calcutta
SAARC, Countries
Scottish Crop Research Instt. Dundee, UK
State Agricultural Deptartments
State Agricultural Universities
United Phosphorus Ltd, Bombay
University of Rennes, France
USDA, Wisconsin
YSPUHF, Solan

Eat potatoes without the risk of becoming fat

There is a common belief that eating of potatoes makes a person fat. This is, however, a myth. Figure conscious ladies and gentlemen need not run away from potatoes. Potatoes contain much greater amounts of water and lower quantities of carbohydrates than the cereals and pulses we generally consume. As such potatoes can be consumed in much greater quantities without running the risk of becoming fat.

The Persons who Shaped the Central Potato Research Institute

Dr S Ramanujam

(1949-51 and 1952-56): Laid scientific foundation for potato research, production technology including seed production, and varietal development in India.

Dr Pushkarnath

(1956-69): Promoted development and release of indigenous potato varieties, production technology and seed production technology in the subtropics.

Dr Mukhtar Singh

(1969-75): Promoted on-farm storage technology, improvement in seed agronomy and input management.

Dr BB Nagaich

(1975-82): Promoted improvement in seed health, development of infrastructure and extension of production technology.

Dr NM Nayar

(1983-89): Promoted modernization of potato research, seed health, improvement of scientific competence and strategic planning.

Dr JS Grewal

(1989-94):Promoted new technologies, modernization of infrastructure and consolidation of research and development.

Present Director

Dr GS Shekhawat

The Institute and its scientists have bagged 31 national and international awards including the ICAR Best Institute Award, Guinness Award, Rafi Ahmed Kidwai Award (Two), Young Scientist Award, Hari Om Trust Award, JawaharLal Nehru Award, Mundkar Memorial Award (Two), FAI Award, Potash Research Institute Award, etc.

Potato Varieties for the Country

S. No.	Variety	Year of Release	Maturity	Resistant/ Immune to	Other Attributes	Adaptability
1	Kufri Kisan	1958	Late			North Indian plains
2	Kufri Kuber	1958	Medium	PVY, PLRV		Punjab, Bihar and Maharashtra
3	Kufri Kumar	1958	Late	Late blight (Moderately)		North Indian hills
4	Kufri Kundan	1958	Medium	Late blight (Moderately)		Himachal Pradesh (HP) and hills of Uttar Pradesh (UP)
5	Kufri Red	1958	Medium		Good keeper	Plains of Bihar and West Bengal
6	Kufri Safed	1958	Late		Good keeper	North Indian plains
7	Kufri Neela	1963	Late	Late blight (Moderately)		Nilgiri hills of Tamil Nadu
8	Kufri Sindhuri	1967	Late		Good keeper	North Indian plains
9	Kufri Alankar	1968	Medium		Early bulker	North Indian plains
10	Kufri Chamatkar	1968	Late	Early blight		North Indian plains
11	Kufri Chandramukhi	1968	Early		Excellent Taste	North Indian plains and plateau region of peninsular India
12	Kufri Jeevan	1968	Late	Late blight		Northern hills
13	Kufri Jyoti	1968	Medium	Late and early blight, wart and viruses	Suitable for Processing	Wide adaptability in hills and plains
14	Kufri Khasigaro	1968	Late	Late and early blight		Hill region of Meghalaya
15	Kufri Naveen	1968	Late	Late blight and immune to wart		Northern hills regions of West Bengal and Meghalaya
16	Kufri Neelamani	1968	Late	Late blight (moderately)		Nilgiri hills
17	Kufri Sheetman	1968	Medium-to-late	Frost		North Indian plains and *Tarai* area of UP
18	Kufri Muthu	1971	Medium	Late blight (moderately)	Suitable for Processing	Nilgiri hills of Tamil Nadu
19	Kufri Lauvkar	1972	Early			Plateau region of peninsular India

Contd.

Contd.

S. No.	Variety	Year of Release	Maturity	Resistant/ Immune to	Other Attributes	Adaptability
20	Kufri Dewa	1973	Late	Frost		*Tarai* Area of western UP
21	Kufri Badshah	1979	Medium	Late and early blight and PVX		North Indian plains and plateau region of peninsular India
22	Kufri Bahar	1980	Medium	Early bulker		North Indian plains
23	Kufri Lalima	1982	Medium			North Indian plains
24	Kufri Sherpa	1983	Medium	Late blight and immune to wart		Hills of West Bengal and Sikkim
25	Kufri Swarna	1985	Medium	Late blight and cyst nematode		Southern hills
26	Kufri Megha	1989	Late	Late blight		Hilly region of Meghalaya
27	Kufri Ashoka	1996	Early			Plains of central and eastern UP, Bihar and West Bengal
28	Kufri Jawahar	1996	Early	Late blight (moderately)	For intercropping	Punjab, Haryana and the plateau regions of MP, Gujarat and Karnataka
29	Kufri Sutlej	1996	Medium	Late blight (moderately)		Western and central Indo-Gangetic plains
30	Kufri Pukhraj	1998	Medium	Late blight (moderately)	Early bulker	Northern plains and plateau region
31	Kufri Chipsona 1	1998	Medium	Late blight	Good for Processing	Entire Indo-Gangetic and Central Indian plains
32	Kufri Chipsona 2	1998	Medium	Late blight, frost	Good for Processing	Entire Indo-Gangetic and Central Indian plains
33	Kufri Giriraj	1999	Medium	Late blight		Hilly region
34	Kufri Kanchan	Yet to be formally released	Medium	Late blight (moderately), wart	Good Keeper	North Bengal and Sikkim hills
35	Kufri Anand	1999	Medium	Late blight and wart	Early bulker	North Indian plains

Maturity Period: Early (60-80 days), Medium (80-95 days), Late (95-120 days)

Services provided by CPRI

Consultancy Services: Potato seed production; true potato seed production technology; rapid multiplication of planting material; potato cultivation and harvesting; equipment fabrication; micropropagation; potato starch manufacturing technology; granulosis virus production for control of potato tuber moth; potato storage; development of specific purpose potato varieties; management of potato diseases, etc.

Contract Research: Post entry quarantine and handling of imported material; multiplication trials for testing yield and processing quality of imported cultivars; quality assessment in potato; ELISA Kits and testing for viruses, viroids, etc.

Contract Services: Testing of agro-chemicals in potato viz., new pesticides, insecticides, fungicides, growth promotors, sprout suppressants, fertilizers additives, etc.

Information and Documentation Services: Inter-library exchange of books and other facilities; technical, extension and research bulletin publications; Potato Newsletter, and documentation of recent articles on potato, current periodicals classified list of new additions, current awareness service, bibliography; reprography, etc.

Miscellaneous Services: Advisory service to potato growers; supply of breeders' seed; supply of antisera for virus testing; organisation of national and international conferences; and Auditorium and Conference Hall facilities.

Indian Cultivars in other Countries

Indian cultivars have also been adopted in other countries. These are Kufri Jyoti in Sri Lanka and Nepal, Kufri Sindhuri and Kufri Lalima in Bangladesh and Kufri Chandramukhi in Afghanistan. Some of the Indian hybrids are also grown commercially in different parts of world, these are 1-654 (CCM – 69.1 in Mexico), I-822 (Krushi in Sri Lanka), I-1035 (Montanosa in Philippines and Mailaka in Madagascar), I-1039 (cv. India in Bolivia and cv. Red Skin in Vietnam), 1-1085 (cv. Sita in Sri Lanka and BSUP–04 in Philippines).

Visitors at CPRI

H.E. Mr. RF Celeste, US Ambassador to India

Dr. RS Paroda, Director General, ICAR and Secretary, DARE, Govt. of India

Former Minister of State for Agriculture and Cooperation, Dr. Som Pal

Chief Minister of HP, Prof. Prem Kumar Dhumal

Dr. Wanda Collins, DDG (Res.) International Potato Center, Lima, Peru

Mrs. Alka Ghosh lighting the lamp for Golden Jubilee celebrations of CPRI

CPRI at Work

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'It is exciting to see the world class work which the scientists and technicians here are doing. The growth of potato production and consumption is a tribute to your leadership. Thank you for introducing us to your outstanding work.'

H.E. Richard F. Celeste
US Ambassador to India
7 July, 1998

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