



# Central Potato Research Institute Newsletter

Number 38

June, 2008

## From the Director's Desk



With the dwindling availability of new agricultural land, the intensification of the existing cropping systems by including potato without sacrificing other crops is the main option to enhance potato production in our country. Potato being a short duration crop, does not compete with other crops in the cropping systems, but fits very well with minor adjustments in crop-cultivar complex enhancing systems productivity and profitability. It can be harvested premature without much loss in yield and quality of food, making it highly amenable to adjustments in various cropping systems. It is also a well-established fact that potato grown in crop rotations or as intercrop reduces the build up of many pests and soil borne diseases, particularly the menacing problem of *Phalaris minor* in rice-wheat cropping system. Being a labour intensive crop, its rural employment generation potential currently is estimated to be 360 million man days of

family labour of small and marginal farmers and landless labourers. These intrinsic qualities of potato make it a most suitable crop for intensification of the cropping system.

Potato is grown in India throughout the country in plains, hills and plateau in varied agro-climatic condition wherever maximum and minimum temperature is not above 33°C and 20° C, respectively for at least certain minimum period (say 40-60 days) during the year. Potato is advocated for cultivation in new areas and diversification of traditional cereal based cropping systems. Potato crop is ideally suited to meet the growing food demand associated with population growth. Potato based cropping systems are highly productive. Productivity of these systems in Indo-Gangetic plains is 68 to 164% more than the most dominant rice-wheat system.

Synergy between potato varieties and cropping systems is essential for intensification in widely diverse cropping situations prevailing in India. Region specific varieties tailored to suit exact requirements of the prevailing cropping systems would help expand potato cultivation. Development of several highly productive and profitable region specific potato based cropping systems and their package of practices were responsible for sustaining the growth. Most suitable potato varieties in important cropping systems in India are presented in this Newsletter for the benefit of the potato growers.

## ISSUE HIGHLIGHTS

From the Director's Desk	1
Research Highlights	2
Traning and Technology Transfer	6
Important Meetings	10
Invited Lectures & Visitors	11
Human Resource	12
Awards, Honours & Foreign Visits	13
Future Activities	13
Potato Facts	14
Article on Potato	15
हिन्दी समाचार	18

## Research Highlights

### New equipments for stage I & II

In stage I and II of breeder seed production programme (of CPRI), potato is planted in a crop geometry different from conventional seed or ware crop. Single indexed seed piece per hill is planted at a spacing of 100 cm in stage I and square geometry is followed by keeping row spacing of 100 cm. Similarly in stage II, row to row spacing is kept 100 cm, while within rows plant spacing remains 20 cm akin to general potato crop. Till now, because of non availability of proper equipment and machines, different field operations in stage I and II were being carried out manually or partially with traditional potato machines and equipments. Limitation with traditional machines was that row spacing was kept 120 cm. This practice required an extra 20% area for the same number of plants and involved a lot of human drudgery in manual work with *khurpa* and *spade* for shaping the ridges and weeding the fields in stage I.

CPRI scientists have been successful in developing a complete set of tractor operated equipments and

machines for cultivation in stage I and II.

**Wide row ridger:** Ridger makes 100 cm ridges of desired shape and size in terms of ridge base width and height



*Earthing up in stage II with wide row ridger*

of the ridge for planting. Same ridger, with minor adjustment is used for earthing up operation after weeding with inter row cultivator.



*Weeding with new inter row cultivator*

**Inter row cultivator:** This is a perfect tool for weeding, fertilizer mixing and opening the furrows for aeration in stage I and II.

**Wide row digger:** A wide row, tractor operated single row digger has been developed for this special purpose crop geometry. This machine is fitted with a moving web for lifting soil & potato mass and a shaker for gently placing the separated tubers on the soil surface without any damage. This is an efficient machine which separates a kg of potatoes from a soil mass of 35-38 kg without any damage.



*Potato digger shaker for stage II*

These equipments have been able to significantly reduce entry of manual labour in to breeder seed fields. Planting, inter-row cultivation and harvesting of stage I and II are now being completed quickly and damage to valued seed material and drudgery to field workers has been reduced to a great extent.

- Sukhwinder Singh & Birpal Singh

### CPRI gets NAIP project on value chain on potato and potato products

CPRI has got a mega project under NAIP on the "Value Chain on Potato and Potato products", which proposes to address the following sectors for overall development of potato in the country.

#### Specifications of the equipments

Machine	Operation	Main components	Performance (capacity ha/day)
Wide row ridger	Ridge making at 100 cm and earthing up operations	Frame, three point hitch system, mould boards, markers, ridge shaper	3.0
Inter row cultivator	Weeding and inter row cultivation	Frame, three point hitch, tines, reversible shovels	3.0
Wide row digger	Potato digging and separating from soil mass	Frame, hitch system, blade, elevator, vibrator, gear box, V belts	1.0 with >95% exposure and < 2% damage

- **Disease-free planting material:** Its availability is a critical input in augmenting potato production in the country. Providing quality seed at reasonable rate will increase production per unit area and thereby, uplift the economic status of the farmers within the ambit of value.
- **Potato processing:** It is increasing at fast pace in India after liberalization of the economy and availability of raw material. Currently 2% of the total potato produce is processed in organized sector and almost similar quantity is processed in unorganized sector with a growth rate of approximately 25%. It is expected to put lot of demand on quality processing raw material. Amongst various processing products, French fries are in great demand. There is need to meet this demand through indigenous production of fries which will not only cut down on cost of fries in the retail chain, but also save millions of rupees on foreign exchange through reduced imports. The project is aimed at spurring necessary growth in French fry industry. Besides, feasibility of developing the market for 'Specialty potato' will also be explored with private partnership.
- **Utilization of potato waste:** Currently, 7-8% of non-marketable potatoes amounting to 1.2 million tons goes waste due to non-availability of indigenous technology for their utilization. Similarly about 25,000 tons of industrial waste is generated causing disposal problems. Recycling of industrial waste and utilization of non-marketable potatoes would solve the disposal

problem and add value to the waste.

To address the above issues, the project aims to undertake the activities like:

- Development of rapid and low cost alternative propagation technologies and diagnostic tools for augmenting seed production
- Augmentation of raw material supply for French fry industry
- Establish a supply chain on specialty potatoes in NCR
- Utilization of industrial waste and non-marketable potatoes for production of animal feed and dietary fibre
- Study market demand and supply chain for planting material, specialty potatoes and French fries.

The sanctioned budget for this project is Rs. 583.57 lakhs and the duration of this project will be of four years.

### Leaf hopper burn PSND resistant Indian potato hybrid JN-189

Potato stem necrosis disease (PSND) caused by a tospovirus is a serious problem in early potato crop in the central & western parts (including plateau) of India. The disease causes economic losses, which vary from place to place & year to year and have been estimated to range from 15 to 30%. Leafhoppers (*Amrasca sp.*) are another problem mostly in early potato crop exposed to higher temperatures. The important symptom of leafhopper feeding is the typical hopper burn and severe feeding can cause up to 30% reduction in crop yields depending on the variety, location and crop growth phase. JN-



Morphological characteristics of JN-189

JN-189 (INGR No. 07040) is the first Indian potato (*Solanum tuberosum* ssp. *tuberosum*) hybrid that was registered for its resistance to leaf hopper and potato stem necrosis tospovirus (PSND). This hybrid was identified following the recurrent breeding selection method from the F<sub>1</sub> progeny of a cross Kufri Jawahar x *S. andigena* at Agricultural Research Station Ummedgang, Kota, Rajasthan (Cross was made in 1974 at CPRI, Shimla).

JN-189 yields between 27-30 t/ha in crop duration of 90-100 days with 5-7% disease incidence of PSND and 2-3% incidence of leaf hopper burn under 'hot spot' conditions. From the screening of potato germplasm at Kota (Rajasthan), which has been identified as the hot spot for both the diseases, genetic stock JN-189 has shown consistently high resistance to both the diseases. JN-189 is a medium maturing culture and produces attractive light purple, oval tubers with medium deep eyes and pale yellow flesh. The use of genetic stock JN-189 as a donor parent in developing potato varieties with combined resistance to PSND and leafhoppers will be highly rewarding.

-RB Singh, SK Pandey,  
SM Paul Khurana & P Manivel

## Wild species of potato – a treasure for potato improvement

Potato has a rich gene pool of nearly 200 tuber bearing species that represent a huge and only partially explored reservoir of germplasm useful for potato breeding. These wild species are very widely distributed through much of the Americas exhibiting both phenotypic plasticity and genotypic variability in abundance, and are adapted to a wide range of habitats. Some species are adapted to grow in the cold, very high Andean regions from 3000 to 4500m, where frosts are common (e.g. *S. acaule* Bitt. and *S. megistacrobium* Bitt.); others occur in dry semidesert conditions (e.g. *S. berthaultii* Hawkes, *S. tarijense* Hawkes and *S. neocardenasii* Hawkes). Some are even found in cool temperate rain forest (e.g. *S. violaceimarmoratum* Bitt. and *S. colombianum* Dun.), and still others on the coastal plains of Argentina and surrounding countries (*S. commersonii* Dun. and *S. chacoense* Bitt.). The wide distribution and adaptation to extreme climatic conditions has rendered wild species to withstand stress environments and resistances to a wide range of pests and diseases.

In spite of concerted efforts to collect the entire genetic variability, only about 130 out of the total known 235 potato species exist in gene banks. Since potato is not native to India, not much genetic variability is expected in the material available within the country. At present, Central Potato Research Institute, Shimla (CPRI) has a collection of over 3000 accessions belonging to 134 species, consisting of cultivated species (*tuberosum* and *andigena*) as well as wild or semi-wild species. These germplasm accessions have been imported from 30 countries and forms

the largest potato collection in Southwest Asia.

There are two basic approaches to genetic resources conservation: *in-situ* conservation and *ex-situ* conservation. At the CPRI, the available germplasm is being maintained *ex-situ*. A part of the accessions belonging to wild species are being maintained in true seed form and advanced clones of wild species in tuber form. The cultivated germplasm (*Tuberosum* group) accessions are being maintained by *in vitro* method also under slow growth cultural conditions. Till date about 1,500 accessions have been conserved in this form and more are being added with the expansion of facilities.

Screening of the germplasm is essential for its utilization. At the CPRI, the wild species are being evaluated particularly for those traits for which genes are not available in cultivated species. Presently, the emphasis is on for finding sources of horizontal resistance to late blight (*Phytophthora infestans*), bacterial wilt (*Ralstonia solanacearum*) and potato tuber moth (*Phthorimaea operculella*), besides tolerance to frost and reduction in cold induced sweetening, etc. Recently, 586 clones of 39 *Solanum* species were screened for late blight resistance by detached leaf method for two years in the laboratory and results were confirmed by screening them for at least one year in the field under natural epiphytotic conditions. The maximum level of resistance was obtained in *S. demissum* followed by *S. spegazzinii*, *S. arnezii* and *S. microdontum*. All the clones in two species viz., *S. cardiophyllum* and *S. vernei* were either resistant or moderately resistant. Similarly, 119 clones of 24 wild species were screened for frost tolerance under severe natural

frost conditions in Modipuram (UP) during Jan., 2006. In all 18 accessions belonging to 8 *Solanum* species were found to be most tolerant. Minimum frost injury was observed in *S. spegazzinii*, though *S. demissum*, *S. commersonii*, *S. acaule*, and *S. tuberosum* ssp. *andigena* also had some tolerance to frost. Some of the clones viz., SS 1770-11 (*S. arnezii*), SS 1735-2 (*S. demissum*), SS 1725-43, 1725-44, 1725-70, 1725-76, 1725-78, 1725-93 (*S. spegazzinii*), SS 1724-23 (*S. sparsipillum*), SS 1763-15 (*S. albicans*), SS 1636-3 (*S. goniocalyx*) and SS 2044-1 (*S. andigena*) exhibited high level of resistance to late blight as well as tolerance to frost. These resistance sources can be exploited for diversifying the source of resistance to late blight and frost in cultivated potatoes.

Use of genetic resources has been even poorer compared to evaluation in potato. It is possible to transfer the genes of interest from wild and semi-cultivated species into cultivated types but the differences in ploidy levels, incompatibility, sterility factors and undesirable characters that invariably flow into the hybrid progenies makes the task difficult and time consuming. Many generations of back crossing and selection to the cultivated parent are needed to restore the desired agronomic characters of economic importance. Undesirable tuber traits of the wild species and crossability problem of certain species have acted as deterrents for their use by the breeders. It has been estimated that only 13 species have been used so far in the variety improvement programmes in the world. Many potato varieties released by the CPRI carry late blight resistant genes from *S. demissum* and *S. andigena*. Parental lines with late blight resistance derived from *S. verricosum* and *S. microdontum*

have also been developed. Similarly resistance to cyst nematodes has been derived from clones with genes from *S. vernei*. *S. phureja* has been used as a pollinator for producing dihaploids in cultivated potato.

Pre-breeding of the wild species at diploid level for combining resistance to various diseases and insect pests with agronomic characters require special attention. This is assuming greater significance under the WTO regimes since the germplasm from other countries may not be easily accessible in future.

*-Vinay Bhardwaj, Jai Gopal,  
SK Luthra, PH Singh & Vinod Kumar*

### Potato successfully grown in hot tropics

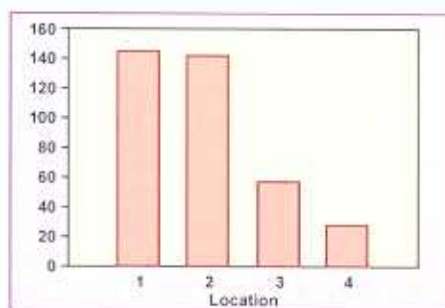
Potato is generally grown in cool climates during summer in hills and winters in North-western plains. In vast areas of peninsular and coastal India, potato cultivation has not been possible because of the prevailing high night temperatures, which inhibits tuberization in potato. Recently, Central Potato Research Institute has developed a heat tolerant potato variety Kufri Surya which is suitable for cultivation in peninsular and coastal parts of India. A pilot study conducted for two consecutive years (2006-07 and 2007-08) at the research



*Tuber yield in Goa (6m<sup>2</sup> plot)*

farm of ICAR Research Complex for Goa, has shown encouraging results. An advanced stage heat tolerant potato hybrid HT/99-722 and Kufri Surya yielded around 60 to 65 q/ha in 75 day crop (late November to early February) in Goa. Apart from yield the proportion of large sized tubers were more in the heat tolerant variety/hybrid.

In a similar study conducted in collaboration with Central Agricultural Research Institute, Port Blair, Andaman & Nicobar islands at four locations, Kufri Surya yielded 141 and 145 q/ha at two locations.



*Tuber yield at four locations  
in Port Blair*

Present results have successfully demonstrated that it is possible to introduce potato as a commercial crop in coastal parts of India, hitherto unknown for potato cultivation. The refinement of agro-production technology will further enhance the yields and firmly establish potato as a new crop in this coastal area, thus making fresh potato available to people of Goa and Andaman & Nicobar islands.

*-Devendra Kumar, J S Minhas  
& S K Pandey*

### Antioxidant rich andigena potatoes

It is known that the purple potato colour is caused by the presence of antioxidants and their presence in diet



*Chip colour in six cultures*

is good for health as they have been associated with a reduced risk of quite a number of diseases and ailments with ageing. Therefore, six anthocyanin rich purple pigmented andigena cultures grown at Central Potato Research Station, Jalandhar during 2007-08 were evaluated for chips. All the six cultures produced chips in different colours and shades. Tubers of JEX/A 911 showed maximum dry matter content (24.8%) and produced most attractive chips having deep yellow colour with purple shade.

*-RS Marwaha, Raj Kumar  
& SK Pandey*

### CPRS, Shillong gets NABARD project

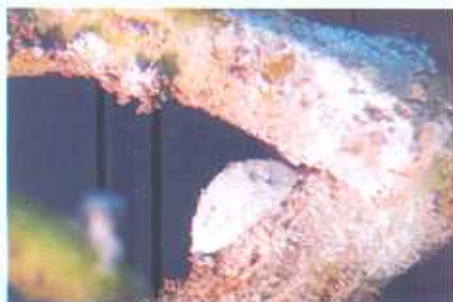
A project entitled "Popularising of Low Cost Storage Technology for Table Potato and Potato Seeds" has been sanctioned by National Bank for Agriculture and Rural Development (NABARD), Mumbai under Rural Innovation Fund (RIF) to be implemented at Central Potato Research Station, Shillong for two years from January 2008 to December 2009. Dr. R. Roy Burman, Scientist (SS), Agricultural Extension is the Principal Investigator and Dr. Brajesh Singh, Senior Scientist, Plant Physiology is an associate in the project. Under the project, storage techniques for table and seed potatoes

are to be disseminated among the farmers in four villages of East Khasi Hills District. The project aims at proper storage of table potatoes at farm household level utilising low cost storage structures for 2-3 months, to enable farmers to regulate the supply of table potatoes in the market and get better price for their produce. Through the community level seed storage structure envisaged in the project, farmers will be able to store seed potatoes and get assured supply of potato seeds at the village level itself.

*-RR Burman, Brajesh Singh  
& S Ramani*

### Problem of mealy bug in potato at Maharashtra

Marathwada area of Maharashtra is not a traditional area for potato crop, however, Bejo Sheetal Seeds Pvt. Ltd. is using TPS technology in this area to popularize potato as an alternative crop in *rabi* season after *kharif* cotton. With the continuous effort of ten years, farmers are growing potato by using TPS or seed tuber in the district of Beed, Parbhani, Nanded, Jalna, etc.



*Incidence of mealy bug on potato plant*

Generally, insect like aphids, white flies, thrips, white grub, etc infest potato field and can be controlled by systemic insecticides. But in the *rabi* season of 2007-08, due to early harvest of cotton crop especially Bt cotton, white coloured mealy bug appeared

on potato plants in farm as well as in farmers' plot. This was first observed in Jalna district and gradually it came in central zone. Previously there was an outbreak of mealy bug in Cotton in North zone during *kharif* 2007 and when cotton was harvested, it came to potato. Controlling mealy bug is very difficult, because it required repeated sprays. Presently it appeared sporadically in potato, but in future this insect can be a threat to potato cultivation in the region.

*-Biswanath Mazumdar,  
Bejo Sheetal Seeds*

### Potato Seed Village at Patna

CPRS, Patna developed a Potato Seed Village at Shahpur village of Danapur block of Patna district during the current crop season. A total of 200 q of foundation seed of improved potato varieties Kufri Jyoti and Kufri Kanchan were produced from four *bighas* of land. Out of 200 q seed, 130 q has already been allotted to different seed growers including farmers by CPRS, Patna and rest 70 q has been kept in cold storage.

*-B Lal, TK Sinha &  
Arjun Kumar Sharma*

## Training & Technology Transfer

### CPRI - A knowledge partner in International potato expo-2008

India International Potato Expo-2008 was organized by Indian Chamber of Commerce (ICC) in collaboration with Govt. of West Bengal and Ministry of Food Processing Industries, Govt. of India from 9-11 January, 2008 at Netaji Indoor Stadium, Kolkata. The Ministry of Agriculture and Ministry of Commerce & Industry, Govt. of India

supported this Expo which was inaugurated by Hon'ble Chief Minister of West Bengal Sh. Budha Deb Bhattacharya. The Expo was attended by other dignitaries like Hon'ble Union Minister of Agriculture, Sh. Sharad Pawar, Hon'ble Minister of Agriculture, Govt. of West Bengal, Sh. Naren Dey, Hon'ble Minister of Food Processing & Horticulture, Govt. of West Bengal, Sh. Mohanta Chatterjee, Member of Parliament, Sh. Sudhangshu Sil & Secretaries of the concerned departments of Govt. of West Bengal.



*Union minister of Agriculture  
at CPRI stall*

Dr. SK Pandey, Director, Dr. BP Singh, Joint Director and Dr. JP Singh, Principal Scientist, CPRI, Shimla delivered the key lectures during the potato session which was chaired by Dr. HP Singh, Dy. Director General (Hort.), ICAR, New Delhi. A farmers' session was also held which was chaired by Dr. SK Pandey, Director, CPRI, Shimla. Exhibition on various aspects of potato was put up by different processing firms, state govt. agencies, NGO's, scientific laboratories and CPRI. A CD on late blight management prepared by CPRI for West Bengal farmers was also released by Hon'ble Sh. Sharad Pawar, Union Minister of Agriculture, Govt. of India. Sh. Pawar also visited the stall of CPRI and commended the achievements made by the scientists of CPRI in development of varieties for

processing and late blight resistance. He also advised that the state government should make liaison with CPRI for the production of good quality potato seed and technology transfer to the end users.

Central Potato Research Institute, Shimla was the KNOWLEDGE PARTNER in this International Potato Expo-2008. This was the platform where potato processors, researchers and farmers interacted with each other on future scenario of potato. This expo was organized to celebrate 2008 as International Potato Year. More than 2500 farmers, exporters, processors, etc. from UP, Bihar, Madhya Pradesh, Punjab, Haryana, Gujarat, Maharashtra and West Bengal participated in this Expo. The role of Central Potato Research Institute, Shimla was widely appreciated by the farmers and other eminent dignitaries.

### Methodology workshop on virus and vector monitoring in Shillong

A methodology training workshop on "Monitoring and sampling of vectors and viruses and GPS handling in Potato" under the ICAR-CIP Project on "Survey of vector and pathogen pressures in potato production regions of North-East India" was held at Central Potato Research Station, Shillong on March 14 and 15, 2008. The workshop was inaugurated by Mr. P. Kharkongor, Commissioner of Agriculture, Government of Meghalaya and Dr. S.V. Ngachan, Director, ICAR Research Complex for the NEH Region, Barapani presided over the function. Dr. M.S. Kadian, CIP-SWCA, New Delhi gave a brief outline of the project and the training.

The purpose of the training workshop was to train the personnel from the cooperative departments in

the states of Arunachal Pradesh, Meghalaya, Mizoram, Nagaland and Sikkim in the various aspects of vector and virus monitoring as well as the use of GPS. Resource persons from CPRI, Shimla, CPRS, Jalandhar, CPRS, Shillong and CIP, New Delhi conducted the workshop. In all 9 participants including a person from CIP, New Delhi participated. The trainees were exposed to aphid monitoring and sampling methods, identification of aphid species, symptoms of potato viruses and detection techniques, methodology for degeneration trials and GPS handling and its utilization in estimating aphid pressure and virus incidence through lectures and practical training. The trainees were provided a collection kit as well as detailed procedure and data sheets to enable data collection.

The Valedictory session was chaired by Dr. SK Pandey, Director, CPRI, Shimla.



*Delegates of CIP-CPRI Workshop*

### On station farmers' training at Shillong

A two day Farmers' Training Programme on "Improved Potato Production, Protection and Storage Technologies" was organised at Central Potato Research Station, Shillong from 28<sup>th</sup>-29<sup>th</sup> March, 2008 under Mini Mission-I project "Integrated Development of Horticulture in NE States including Sikkim". Fifty six farmers from the

villages Sanmer, Mawklot, Nongpiur, Umlyngka, Myrkhan, Laitmynsaw and Myllem participated in the training programme. Farmers were trained on different aspects of potato cultivation, viz., varieties, agronomic practices, pests and diseases and their management, storage techniques for potato, potato processing and potato production through TPS during the training programme. Practical sessions were organised in the training programme to demonstrate planting method of seed tuber, sowing of TPS in the nursery and plant protection techniques. At the end of the training programme there was a general discussion with the farmers regarding their problems in potato cultivation. Farmers during their feedback indicate the benefit they had derived from the training programme and also promised to follow the cultivation practices and technology they had learnt during the programme. The farmers were greatly interested in the modern techniques of potato cultivation. Dr. RP Medhi, Director, National Research Centre on Orchids, Pakyong and Nodal Officer MM-I distributed certificates among the trainees in the valedictory session.



*Hands on training in planting method*

### On-farm farmers' training under NABARD RIF Project at Shillong

On-farm farmers' training programme on "Low Cost Storage

Technology for Table Potatoes and Potato Seeds” was organised by Central Potato Research Station, Shillong at Madan Ing Syiem village of Myllem block in East Khasi Hills district on 9<sup>th</sup> April 2008. The training programme was organised as part of the NABARD RIF project. The inaugural session was presided by Dr. S Ramani, Head, CPRS, Shillong, Dr. Brajesh Singh, Senior Scientist, CPRI, Shimla and Dr. R Roy Burman, Scientist, Central Potato Research Station, Shillong were the resource persons for the programme. A total of thirty farmers were present in the training.



Farmers training on storage of potatoes

### Potato farmers' club promoted in Meghalaya

Central Potato Research Station, Shillong promoted the “Myllem Potato Farmers' Club” in East Khasi Hills district of Meghalaya in collaboration with the Myllem branch of Meghalaya Rural Bank with financial assistance from NABARD, Meghalaya Regional Office. The Farmers' Club is a grassroot level informal forum and is organised by Meghalaya Rural Bank with the support and financial assistance from NABARD for the mutual benefit of the banks and rural people. The broad functions of the Farmers' Club include coordination with banks to ensure credit flow

among its members and forge better bank borrower relationship, arranging interface with subject matter specialists in the fields of agriculture and allied activities, fostering liaison with corporate input suppliers to purchase bulk inputs on behalf of members, organising joint activities like value addition, processing, collective farm produce marketing for the benefit of members, sponsoring Self Help Groups (SHGs), undertaking socio-economic and community developmental activities and marketing rural produce and products. The Launch Meeting of Myllem Potato Farmers' Club was organised at Central Potato Research Station, Shillong on 6<sup>th</sup> December 2007 and Ms. MHK Marak, Secretary (Agriculture), Government of Meghalaya was the Chief Guest and representatives from NABARD, the State Department of Horticulture and other officers were present. The club has a membership of 15 persons at present. The launch meeting was followed by a Base Level Orientation & Training Programme in which the resource persons from NABARD, Meghalaya Regional Office trained the farmers about the maintenance and functioning of the club, activities to be undertaken and the procedures to be followed at different stages by the club members. The training programme ended with a positive note from the members of the club and they pledged for dynamism and enthusiasm in carrying out the club activities.

### On-farm training on disease management

On-farm Training on “Disease Management in Potato” was organized by Central Potato Research Station, Shillong during 7<sup>th</sup> to 9<sup>th</sup> May 2008 at three villages, viz., Umlyngka,

Myllem and Nongpiur in East Khasi Hills district of Meghalaya. Dr. PH Singh, Principal Scientist, Central Potato Research Institute, Shimla and Dr. RK Arora, Principal Scientist, Central Potato Research Station, Jalandhar were the resource persons for the training. The training programmes were organised as a part of MM-1 project on “Integrated Development of Horticulture in NE States including Sikkim”. Resource persons imparted training and practical sessions on identification, prevention and control measures of major potato diseases prevalent in this region. A total of 150 farmers (50 farmers each at three different locations) participated in the training programme.

### Alu Pathshala on AIR

To celebrate International Year of Potato 2008, division of Social Sciences organized Aloo Pathshala on All India Radio, Shimla. In this programme, 20 talks on recent technologies related to potato production by the following scientists, viz., Drs. SK Pandey, PM Govindakrishnan, Jai Gopal, KR Dhiman, VK Dua, KC Sud, SS Lal, MC Sood, PH Singh, ID Garg, VK Chandla, Surjeet Singh, Ashwani Kumar, RK Rana, Brajesh Singh, JS Minhas, KC Thakur, PS Naik, NK Pandey and Anil Kumar were recorded. The broadcasting of these recordings started from March, 2008.



Director CPRI during his talk at AIR



During this programme a Jingle on potato is also being broadcasted. On every topic, a question related to particular talk is being asked from the farmers in the end. On the basis of the correct answers received from the farmers, 10 farmers would be selected for the award. The selected farmers would be given award and a citation on the occasion of Kisan Mela which would be organized in the last quarter of the year.

### PTM awareness camp at Nagrota

An awareness camp on potato tuber moth (PTM) was organized at Block Office, Nagrota in Kangra district of Himachal Pradesh on 12<sup>th</sup> May 2008. Nagrota block is known for supplying good quality potatoes to the processors during off-season and is also a hot spot for PTM infestation, which occurs during the maturity and harvesting of potato crop and gets aggravated during the storage of potatoes in non-refrigerated stores. The camp aimed at educating the farmers and potato traders on the latest package of practices for controlling PTM during crop phase and storage.

About 50 farmers and traders of the neighbouring villages, viz., Malan,

Pathiyar, Ambari, Lakha Mandal, Hatwas and Arla participated in this camp. The scientists, viz., Drs. VK Chandla, Brajesh Singh, Anil Kumar, from CPRI, Dr. RS Chandel, from CSKVV and Dr. Sanjay Kumar, from Pepsico addressed farmers on the various issues related to crop husbandry, PTM control, storage and quality aspects in potatoes. All the farmers were keen to understand the latest PTM control strategies and they also saw the potato exhibition put up by CPRI on this occasion.

### Training of farmers at CPRS, Patna

A total of 315 potato farmers from Rohtas, Buxur, West Champaran, East Champaran Siwan, Nalanda, Kaimur, Patna, Katihar, Samastipur, Vaishali, Saran Bhojpur, Purnea and Madhepura districts of Bihar were trained at CPRS, Patna on "Potato Seed Production" and "Scientific Potato Cultivation" in the training programmes organized on 02-01-2008, 15-01-2008, 30-01-2008 and 15-02-2008. Drs, RP Rai, S Kumar, Manoj Kumar, SK Singh, Barsati Lal, TK Sinha and Sh. Arjun Kumar Sharma imparted trainings to the farmers.

About 300 farmers (including 60 farm women) sponsored by National Horticultural Research and Development foundation, Patna were trained by the team of scientists from CPRS, Patna. During the training programmes, lectures on different aspects of potato cultivation, viz., use of HYV of potato, seed bed preparation for TPS, plant protection, seed treatment and storage, etc. were covered. A field visit for adequate exposures was also arranged to show the on-farm operations like roguing, pesticide sprays and agricultural implements used in potato cultivation.

Besides, scientists of CPRS, Patna, viz., Drs. SK Singh, Sambhu Kumar and Manoj Kumar also imparted trainings in several training programmes organized by ATMA, Patna on 03.01.08; Sarai, Danapur on 04.01.08; Chikura Khurd Pahari, Patna on 7.01.08; Janpara, Vikram on 9.01.08; and Painal, Bihta on 19.3.08, and by Directorate of Extension RAU, Pusa, Samastipur during February 2008.

### Doordarshan programmes at Patna

Live phone-in programmes on late blight management and storage were



Discussion with farmers at PTM camp



Farmers training at Patna

telecast from Doordarshan Kendra, Patna on 29.01.2008 and 11.03.2008. Drs. RP Rai, SK Singh, Shambhu Kumar and Barsati Lal from CPRS, Patna participated in these programmes. Dr. SK Singh, Senior Scientist also participated in ETV, Bihar Programme "ANNADATA on subjects *Allo ki khudai se purb evam khudai ke paschat ki sawadhaniya* on 3.02.08 and *Aloo adharit phasal pranali evam phasal chakra* on 18.01.08. Similarly, Dr. Shambhu Kumar participated in programme on "*Satya aloo beej dwara aloo ki kheti se labh*" (12-01-2008) and "*Aloo mein ageta jhulsa rog evam bachav ke upay*" (18-01-08).

### Participation in kisan mela and exhibitions

CPRS, Patna participated and put-up potato exhibition stall in farmers fair held during 9-10 Feb, 2008 at IIVR, Varanasi and 8-9<sup>th</sup> Feb, 2008 at Hazaribagh. Drs. RP Rai, Barsati Lal, Manoj Kumar and TK Sinha and Sh. Arjun Kumar Sharma participated in these programmes.

### Important Meetings

#### Workshop on enhanced food and income security in SWCA

A workshop on "Enhanced food and income security in SWCA through potato varieties with improved tolerance to abiotic stress" was organized by International Potato Center-region SWCA, New Delhi, in collaboration with Central Potato Research Institute, Shimla during 20<sup>th</sup> to 22<sup>nd</sup> May, 2008 at CPRI, Shimla. The objective of the workshop was to plan the activities of the above project funded by GTZ, Germany. Representatives from CIP, Lima, Peru, CPRI, Shimla, Federal center for breeding Research, Germany and

NARS representatives from Bangladesh, Tajikistan and Uzbekistan participated in this workshop. Presentations were made by Dr. Roland Schafleitner from CIP, Lima, Peru; Drs. SK Pandey, Jai Gopal, PM Govindakrishan and Vinay Bhardwaj from CPRI, Shimla; Drs. Carlo Carli and MS Kadian from SWCA, CIP, Tashkant and New Delhi; Dr. S Seddig, Institute of abiotic stress tolerance, Germany; Drs. K Aliev and Z Davlyatnazarova from Tajikistan; Drs. E Holmuratov and G Nasirova from Uzbekistan and Dr. M Hossain from BARC, Bangladesh. These presentations covered the status of the stress-prone environments, breeding research with regard to abiotic stress, screening method used for abiotic stress, and GIS mapping for abiotic stress in different countries of South West & Central Asia. Presentations were followed by discussion, which was aimed at developing strategies for the implementation of this project. Broad guidelines were developed for gaining access to breeding tools to improve abiotic stress tolerance and to develop locally adapted potato varieties with market characteristics. Strategies for integrating basic research with screening methods for breeding, field experimentation and extension services (models, maps, screening tools, participatory selection, etc.) were also planned.



Participants of SWCA workshop

The draft workplans were presented in the Plenary Session which was chaired by Dr. HP Singh, DDG (H), ICAR, New Delhi. The work plans as approved by Dr. Singh will be circulated to all the participants so as to give concrete shape to these workplans by the various participants for its earnest implementation to the set goals in this time bound important programme. On the last day of the workshop, participants visited the various laboratories at CPRI Shimla and experimental and seed farm of CPRS, Kufri.

### RAC Meeting at Shimla

The meeting of Research Advisory Committee (RAC) was held on 12<sup>th</sup> and 13<sup>th</sup> June 2008 at CPRI Shimla under the chairmanship of Dr. M Mahadevappa. During the meeting,



Members of RAC at Shimla

the programme leaders of various institute programmes presented the action taken report on the previous recommendations, achievements of the programme for the 2007-08 and also the plan of work for the next year i.e. 2008-09. The other members of the RAC present in the meeting included Dr. AN Maurya, Dr. PC Gaur, Mr. Prakash Lohia, Mr. Man Singh and Mr. DJ Nikam. The honourable members of the RAC gave various suggestions to improve the outcome of the ongoing research programmes of the Institute.

## Invited lectures & Visitors

### Parliamentary standing committee on agriculture visits CPRI

The Parliamentary Standing Committee on Agriculture visited CPRI, Shimla during May 21 to 23, 2008. The committee was chaired by Sh. Vikram Verma, honourable Member of Parliament. The other members of Parliament of the committee were Smt. Kalpana Ramesh Narhire, Sh. Sharad Anantrao Joshi, Sh. Girdhari Lal Bhargava, Sh. Prabosh Panda, and Sh. Harish Rawat. The committee reached Shimla on 21<sup>st</sup> May at 7.00 PM and was welcomed by the Director, CPRI and Dr. Jai Gopal, Liaison Officer.

On 22<sup>nd</sup> morning, the committee visited Central Potato Research Station, Kufri where it was welcomed by Dr. HP Singh, DDG (H) and Dr. SK Pandey, Director, CPRI. Other officers of CPRI, Shimla were also present during the occasion. Dr. Pandey made a presentation on the history, mandate and achievements of the CPRI since its establishment. The committee members appreciated the work done by the CPRI, which has led to tremendous improvement in potato production and has helped the farmers in improving their income. The various bottlenecks coming in the way of potato development and export were also brought to the notice of the committee by Dr. SK Pandey. Dr. HP Singh suggested that like other major crops, the potato should also figure in the food policy of the Govt. of India. The need to fix a support price for potato was also highlighted. Most of the members agreed with regard to the suggestions



*Parliamentary committee at CPRI*

made by the DDG (H) and Director (CPRI). They were convinced that effective procedures and precautions with regard to import and export of potato need to be taken as potato is vegetatively propagated crop and thus, is prone to many diseases. The chairman assured that they will take up the issue with the Govt. of India particularly with regard to the developing export chains for potato. The need to improve the availability of high quality seed to the farmers by revamping the whole seed production system was also discussed. It was felt that the State Governments who have the responsibility of producing the Foundation seed after the Breeder seed is supplied to them by the CPRI, should take up this activity earnestly.

that CPRI is one of the leading institutes of the world in potato research. In the afternoon, the scheduled meeting with the State Govt. officials of Agriculture and Cooperation was held at CPRI. The committee left in the morning of 23<sup>rd</sup> May, fully satisfied with regard to the arrangements made by the CPRI.

### Scientist meet at CPRI, Shimla

Scientist meet is a regular activity of the Institute, where on every Fridays, scientists, technical officers and research associates meet to discuss & deliberate on latest & emerging R & D issues. Following lectures were delivered & discussed during the last 6 months.

Date	Speaker	Topic of scientist meet
11.1.2008	Mr Deep Kumar	RNA silencing – Defence against viruses and its counter by viruses
28.3.2008	Dr Bruce Weir	Association mapping for quantitative traits
2.5.2008	Mr Surya Pandey	Demonstration of SYSTAT software
23.5.2008	Ms Garima Thakur	Anti microbial drugs
27.5.2008	Mr Girish Behal	Promotional and marketing avenues of online journals
6.6.2008	Ms Anjali Chamail	Ribozymes
13.6.2008	Dr M Mahadevappa	Parthenium – Global status, ill effects and its management

## Human Resource

### Promotions

Scientific		
	From	To
N.K. Pandey	Sr. Scientist	Principal Scientist
Arun Pandit	Scientist	Scientist-SS
SJ Gawande	Scientist	Scientist-SS
MK Jatav	Scientist	Scientist-SS
Technical		
Islam Ahmed	T-7-8	T-9
Harvir Singh,	T-5	T-6
Ramesh Chand,		
KP Singh, Ashok Kumar		
Rajneesh Rajput,	T-4	T-5
Kusum Singh,		
Kashi Prasad,		
Shruti Gupta,		
Rabindra Sharma,		
VK Yadav, Murari Lal,		
B Chandran,		
Santosh Kumar,		
Omvir Singh, SK Gupta		
Udaivir Singh,	T-3	T-4
Kundan Singh,		
Munna Lal Bharti		
Harbans Lal, NK Sharma,	T-2	T-3
Agre Nand Singh, Radha		
Krishnan, Sampat Singh		
Ajay Vir, Mahesh Pal	T-2	T-I-3
Singh, Narayan Singh		
T Selvaraj, Ashok Kumar	T-1	T-2
Administrative		
Jai Ram Thakur	Sr. Clerk	Financial upgradation
Sashi Bala Thakur,	Steno	Financial upgradation
Rajesh Kumar,		
Suresh Kumar		
Mohinder Singh	UDC	Financial upgradation
Sandeep Verma,		Financial upgradation
Deep Ram, Santosh Kumar	LDC	
Supporting		
Basdeo Rai and	SSG III	SSG IV
Kashi Chaudhary		
Munshi Lal and Rajbir	SSG II	SSG III

### Appointment

Name	Post	Joined on
Jagesh Kumar	Scientist	19.5.2008
Uma Maheshwari	Scientist	16.5.2008
AK. Srivastava	Scientist	16.5.2008

### Transfers

Name	From	To
SJ Gawande (Scientist)	CPRI, Shimla	CICR, Nagpur
N Somasekhar (Senior Scientist)	CPRS, Ooty	DRR, Hyderabad
Manoj Kumar (Senior Scientist)	CPRS, Patna	CPRI, Shimla
VK Gupta (Scientist SS)	CPRS, Shillong	CPRIC, Modipuram
Tilak Raj (T-4)	CPRI, Shimla	CPRS, Kufri
Yogesh Chaudhary (T-5)	CPRI, Shimla	CPRS, Patna
Bhag Singh (T-2)	CPRI, Shimla	CPRS, Jalandhar
RR Das (Assistant)	CPRS, Patna	CPRS, Gwalior

### Retirements

Name	Post	Retired on
Yash Gupta	Senior Scientist	17.01.2008
Ram Kishore	Principal Scientist	31.01.2008
KC Sud	Principal Scientist	31.5.2008
DB Singh	Principal Scientist	31.5.2008
PC Pande	Principal Scientist	30.6.2008
Shiv Kumar	Principal Scientist	30.6.2008
Jaspal Singh	T-1-3	30.4.2008
Daya Ram	SSG IV	31.3.2008
Udham Singh	SSG IV	30.4.2008
Basudeo Rai	SSG IV	30.4.2008
Lachman Dass	SSG III	31.5.2008
Matha Ram	SSG IV	31.5.2008

### Resignation

Name	Post	Resigned on
KC Thakur	Senior Scientist	28.5.2008

### New executive of IPA takes over

In the IPA elections held in the first quarter of 2008, the new executive has been elected. The elected executive will run the association for the two consecutive years i.e. 2008 and 2009. It consists of following positions:

Post	Elected member
President	Dr. SK Pandey
Secretary	Dr. SK Chakrabarti
Joint Secretary	Dr. VK Dua
Treasurer	Dr. NK Pandey
Vice President Region I	Dr. JS Minhas
Vice President Region II	Dr. S Ramani
Vice President Region III	Dr. RS Marwaha
Vice President Region IV	Dr. SV Singh
Vice President Region V	Dr. RP Rai
Vice President Region VI	Mr. SS Shivalli

## Awards, Honours & Foreign Visits

### Participation in FAO workshop

Dr. HP Singh, Deputy Director General (Hort), ICAR and Dr SK Pandey, Director, CPRI participated and delivered lectures in one day workshop organized by FAO at its Regional Office, Bangkok, Thailand on 6<sup>th</sup> May, 2008 to Commemorate the International Year of Potato – 2008. The workshop was inaugurated by His Excellency Mr. Theerachai Saenkawl, Deputy Minister of Agriculture and Cooperative, Royal Government of Thailand. Dr. Pamela K Anderson, Director General, CIP, Lima Peru delivered a key note address on “Potato in 21<sup>st</sup> Century – Opportunities and Challenges”, while Dr. HP Singh spoke on “Policies and strategies conducive to potato development in Asia-pacific region” and Dr SK Pandey on “Priorities for potato research and development in Asia Pacific



Workshop to Commemorate the International Year of Potato - 2008  
FAO/ICAR, Bangkok, Thailand, 6 May 2008

Participants of the FAO workshop

### Participation in workshop on potato development in Bhutan

Dr. SK Pandey, Director, CPRI and Dr. BP Singh, Joint Director, CPRI Campus, Modipuram were invited as panelists in the workshop on “Potato Development in Bhutan-Experiences Generated and Way Ahead” held between 6 to 10 May, 2008 in Bhutan.

Dr. S Ramani, Head, CPRS, Shillong was also invited to participate in the workshop. The workshop was organized jointly by Bhutan potato development programme in association with Common fund for commodities and International potato centre. During the workshop, CPRI scientists visited different potato growing areas of Bhutan and discussed the possibilities of improving the potato development programme in the country. It was observed that CFC funded potato programme being run in Bhutan was well conceived and executed. Besides, technology transfer related to cultivation in remote hilly regions was commendable.

### CPRI scientists participated in GILB conference

Dr. Bir Pal Singh, Joint Director, CPRIC, Modipuram, Dr. Jai Gopal, Head, Division of Crop Improvement, CPRI, Shimla and Dr. RK Arora, Principal Scientist, CPRS, Jalandhar were invited by Global Initiative on Late Blight to participate in the International conference on late blight held at Beijing, China from 3<sup>rd</sup> to 6<sup>th</sup> April, 2008. The conference was attended by 125 delegates from 25 countries, in addition to an equal number of delegates from the host Chinese Academy of Agriculture Sciences, Beijing, China. All the three scientists from CPRI presented their respective papers in the conference and took part in the deliberations. These presentations were helpful in highlighting the late blight research on potato being conducted by CPRI at the international level.

### Dr. Jai Gopal participated in task force II meeting

The Food & Agriculture Organization, Rome of United Nations invited Dr. Jai Gopal to participate in the Task Force II meeting of Global Partnership Initiative for

Plant Breeding (GIPB) held at FAO Headquarters, Rome during 23<sup>rd</sup> to 24<sup>th</sup> April, 2008. FAO had invited in all 25 scientists from all over the Globe for this meeting, including Dr. Jai Gopal from India. The purpose of Task Force II meeting was to hold the stake holders consultation process to define the parameters and organizational implementation framework for GIPB. The delegates discussed the matters related to exchange of genetic resources, tools, methodologies, know how and facilities between stake holders. Based on the discussions, GIPB has established a web-portal so as to act as facilitators for accelerating plant breeding activities.

### CPRI scientists visited Sri Lanka

Dr JS Minhas and Dr SK Kaushik visited Sri Lanka to attend the International Potato Symposium held at Sita Eliya, Nuwara Eliya, Sri Lanka on April 3-4, 2008. Dr JS Minhas made a presentation entitled, “Extending potato cultivation to warmer regions of peninsula and coastal India with new heat tolerant potato variety Kufri Surya” and Dr SK Kaushik made a presentation entitled, “Introgression of late blight resistance from *Solanum* species with particular reference to potato” during the symposium.

## Future Activities

### IRC meeting at Shimla

The Institute Research Council (IRC) meeting of CPRI for 2008 will be held during 23<sup>rd</sup> to 25<sup>th</sup> July 2008 at Shimla wherein all the programme investigators and several scientists shall take part. During the meeting, annual progress report for 2007-08 for all the institute programmes shall be evaluated and the work plan for the next year shall be discussed.

## Farmers training at Shimla

A farmers training is going to be organized at CPRI, Shimla during 8<sup>th</sup> to 10<sup>th</sup> July 2008. The training aims to impart knowledge on various technologies developed by the Institute to the potato seed growers of the different districts of Himachal Pradesh so that these seed growers may further pass on the gained knowledge to the fellow farmers.

## Kisan mela at CPRI

A *kisan mela* is being organized at Shimla during the last quarter of 2008 to commemorate the International Year of Potato 2008. An *alu pathshala* is already being broadcasted through AIR in this connection and at the end of this *pathshala* the *kisan mela* will be held at Shimla.

## Potato Facts

### Scientist says acrylamide might not be so harmful

A toxic chemical that surprised scientists when it was discovered in certain foods might not be as big a concern after all, an Augusta researcher said. Acrylamide is a neurotoxin and carcinogen formed in food when carbohydrate-rich material that also contains the amino acid asparagine is exposed to high heat such as deep-fat frying or baking. The highest amounts are in potato chips, for instance. The acrylamide discovery in food in 2002 by Swedish researchers kicked off a flurry of research into acrylamide. "The big question was, 'Is there enough in food that's going to produce a significant health hazard?' And through a huge amount of that research, it appears that it's not going to be a major health issue." The EPA panel meeting is expected to recommend the new safe level as 3 micrograms per kilogram per day, up

from 0.2 micrograms per kilogram per day set in 1988. It is unlikely for anybody to be able to consume enough acrylamide to have a significant risk for cancer or (other) diseases," Dr. Dale Sickles neurotoxicologist and vice chairman of Cell Biology and Anatomy at Medical College of Georgia said. The toxin has been shown to cause cancer in rats at a rate of 2 milligrams per kilogram per day. Most Americans, however, would get an average of 0.4 micrograms per kilogram per day and the highest exposure would probably be about 1 microgram, or 1 / 2,000 of the amount found to cause cancer in rats.

Source: Internet

### Soaking potatoes 'cuts cancer risk'

Soaking potatoes in water before frying them can cut levels of a potentially cancer-causing chemical by 50 per cent, according to a new study. The study, published in the *Journal of the Science of Food and Agriculture*, found that washing raw chips, soaking them for 30 minutes and soaking them for two hours reduced the formation of acrylamide by up to 23 per cent, 38 per cent and 48 per cent respectively but only if they were fried to a lighter colour. Baked, fried and roasted food should be cooked to golden yellow rather than nut brown, and consumers should avoid overcooked foods and cut intake of crisps, chips, and other high-acrylamide foods, according to the conclusions of a recent EU study.

Source: Internet

### Polyphenols may be the key to low acrylamide bakery

Manufacturers of bakery products looking to reduce levels of acrylamide can tap into a range of solutions, but

polyphenols may be the most promising, suggests a new review. "The most promising field for acrylamide reduction is the addition of low molecular additives such as polyphenols, which have not so far been applied in cereal products," wrote Achim Claus, Reinhold Carle and Andreas Schieber in a recent issue of the *Journal of Cereal Science*. The review is a timely pooling of the significant and often rapid progress that has been made in acrylamide-reduction, since it first hit the headlines in 2002. Studies are beginning to emerge that show antioxidants may reduce acrylamide levels, with evidence available that ascorbic acid (vitamin C), and rosemary extracts reportedly reducing levels of the potential carcinogen in breakfast cereals, crackers, and even olive oil used for frying.

Source: Internet

### Potato is safest food on the menu, study found

A new British study has identified the potato as the safest food on the menu, saying it is the least likely food to cause fatigue, irritable bowel syndrome, eczema, and migraine. The study, which involved giving food intolerance tests to over 8,000 volunteers, found that less than one percent of the participants tested positive for potatoes. Though some food intolerances appear to be caused by too much of the same food, on a too regular basis, it seems that the potato is the exception to the rule as each and every person in the UK eats on average 200lb of potatoes a year.

Source: Internet

### Neo-infrared scanner spots diseased potatoes

A New Zealand company is helping United States potato growers save millions of dollars by spotting

diseased potatoes before they are turned into chips. A disease known as zebra chip is causing big problems for potato growers, who face having entire loads of potatoes devalued or rejected by chip-makers. But Auckland company Taste Technologies has developed a sorting method that can find out if potatoes have the disease before they are sent to manufacturers. CSS Farms, which provides potatoes to potato chip giant FritoLay, has been using the technology to spot zebra chip at its Texas base for a year.

*Source: Internet*

### New potato chip line for cholesterol reduction

Functional snack company Corazonas is launching potato chips containing plant sterols for cholesterol reduction, and claims to be the first manufacturer to take the healthy ingredient into this kind of snack product. The company, which was spun out of functional foods development hothouse Brand New Brands, has previously introduced a range of tortilla chips to the US market in May 2006. But by making healthy potato chips it looks to be setting new boundaries in the kinds of products that carry health-enhancing ingredients.

*Source: Internet*

### Quote of the Day

*"Mashed potatoes are ultra-filling. Don't pass up this comfort food when trying to slim down—it's key for curbing hunger! When boiled, potatoes are the most filling food around—three times more filling than bread, according to an Australian study. Result: Potatoes make you feel satisfied faster and longer, so you consume fewer calories later." (Quoted at "Women's World magazine, US).*

*Source: Internet*

## Article on Potato

### Synergy of potato varieties and cropping systems in India

#### India needs more potatoes

India needs to produce more potato than at present to meet rising domestic consumption and exports. Rich or poor alike prefer potato as daily food, vegetable or snacks, for its high nutritive value, palatability and amenability in various culinary preparations. Post independence per capita consumption of potato increased from 4.37 kg to 17.3 kg/yr despite growth in population. However, it is still only a fraction of consumption of 93.8 kg/yr in Europe and 48.2 kg/yr in North American developed countries. Thus, increasing population coupled with growing preference for potato is likely to push the domestic consumption steeply. The demand for export is also rising for various reasons. The total demand for potato in the year 2020 is projected to be 44.6 million MT against the current production of 24 in 2007. Role of potato varieties and cropping systems will be crucial in enhancing potato production in India.

#### Intensification of cropping systems

Intensification of the existing cropping systems by including potato without sacrificing other crops is the only alternative to enhance potato production, because of shrinking availability of land caused by rapid urbanization, growth of infrastructure, industrialization and land degradation. Some intrinsic qualities of potato crop help promote such intensification. These are short duration of the crop, high volume of food produced per unit area and time and its amenability to adjustments in cropping. Inclusion of potato in cropping systems enhances systems productivity and profitability significantly.

#### Synergy between potato varieties and cropping systems

India is a vast country and diversity of cropping systems prevails in response to widely varying agro-climatic and socio-economic conditions. Potato is grown under irrigated and rainfed, low and upland conditions, in hills and plains, in summer, winter, and spring seasons depending upon regional requirements. Then, there are certain regions suffering from purely local problems of wart and cyst nematodes. Few or limited set of potato varieties can not be expected to perform equally efficiently under all these widely contrasting situations. Region specific varieties tailored to suit exacting requirements of the prevailing cropping systems would help expand potato cultivation. This synergy between potato varieties and the cropping systems is critical for intensification and proliferation of potato in future in India.



*Intercropping of potato with wheat*

#### Diversity of potato varieties in India

The Central Potato Research Institute, Shimla has bred 41 high yielding varieties (HYV) with wide range of desirable attributes. Contributions of Kufri Jyoti, Kufri Bahar and Kufri Pukhraj in increasing production in Indo-Gangetic plains are well acknowledged. More recently, Kufri Chipsona 1 and Kufri Chipsona 3 have renewed the interest of Industry and growers, for their highly competitive processing qualities.

Newly released heat tolerant Kufri Surya will be valuable in extending potato cultivation in hot season and southern plains too. Diversity of potato varieties is available with special purpose and region specific attributes.



*Intercropping of potato with lentil*

### **Potato growing zones in India**

There is a strong interaction between crops and environmental factors influencing the productivity of crops and cropping system. Thus, evolution of cropping systems is specific to a region of more or less homogeneous agro-climatic conditions. There are 8 distinct potato growing Agro-ecological zones in India. These are:

1. **North-western plains:** Punjab, Haryana, parts of Jammu and Kashmir and Rajasthan
2. **West-central plains:** Western and central UP, Uttarakhand, MP, Chhattisgarh and Rajasthan
3. **North-eastern plains:** Eastern UP, Bihar, Jharkhand, West Bengal and Orissa
4. **Plateau region:** Karnataka, Maharashtra and Gujarat
5. **North-western hills:** Jammu & Kashmir, HP and Uttarakhand
6. **North-eastern hills:** Assam, Meghalaya, Arunachal Pradesh, Manipur, Nagaland, Mizoram and Tripura
7. **Sikkim and West Bengal hills**
8. **Southern hills:** Nilgiris in Tamil Nadu

### **Suitable potato varieties for important cropping systems in different potato growing zones**

Cropping systems	Suitable potato varieties
<b>North-western plains</b>	
Rice-potato-late wheat	Kufri Pukhraj, Kufri Jyoti, Kufri Chandramukhi, Kufri Surya
Rice-potato-sunflower	Kufri Pukhraj, Kufri Jyoti, Kufri Pushkar, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Surya, Kufri Badshah
Okra-potato-tomato	-do-
<b>West-central plains</b>	
Rice-potato	Kufri Bahar, Kufri Sadabahar, Kufri Pukhraj, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Surya, Kufri Pushkar
Potato-sugarcane	-do-
Rice-potato-sunflower	-do-
Soybean-potato-okra	-do-
<b>North-eastern plains</b>	
Rice-potato-rice	Kufri Jyoti, Kufri Pukhraj, Kufri Pushkar, Kufri Surya, Kufri Chandramukhi
Rice-potato-jute	Kufri Jyoti, Kufri Pukhraj, Kufri Pushkar, Kufri Surya, Kufri Chandramukhi, Kufri Chipsona 1, Kufri Chipsona 3
Rice-potato-onion	Kufri Ashoka, Kufri Arun, Kufri Jyoti, Kufri Pukhraj, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Pushkar, Kufri Surya, Kufri Chandramukhi
Rice-potato-sesame	Kufri Jyoti, Kufri Pukhraj, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Surya, Kufri Pushkar, Kufri Chandramukhi
<b>Plateau region</b>	
Groundnut-potato-pearl millet	Kufri Jyoti, Kufri Lauvkar, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Surya, Kufri Pushkar, Kufri Jawahar
Sesame-potato-groundnut	-do-
Potato-potato	-do-
Potato-finger millet	-do-
Potato-onion	-do-
<b>North-western hills</b>	
Vegetable peas-potato	Kufri Jyoti, Kufri Giriraj, Kufri Himalini
Potato-potato (mid hills)	Kufri Jyoti, Kufri Giriraj, Kufri Himalini, Kufri Himsona
Radish-potato	Kufri Jyoti, Kufri Giriraj, Kufri Himalini, Kufri Himsona
<b>North-eastern hills</b>	
Potato-potato	Kufri Jyoti, Kufri Megha, Kufri Giriraj, Kufri Himalini, Kufri Himsona
Rice-potato (Foot hills)	-do-
Radish-potato	-do-
<b>Sikkim and West Bengal hills</b>	
Potato-potato	Kufri Jyoti, Kufri Kanchan, Kufri Himalini
Maize-potato	Kufri Jyoti, Kufri Kanchan, Kufri Himalini
<b>Southern hills (Nilgiris in Tamil Nadu)</b>	
Potato-potato	Kufri Jyoti, Kufri Swarna, Kufri Giriraj, Kufri Himalini, Kufri Himsona
Potato-carrot	-do-
Potato-cabbage	-do-
Potato-cabbage-potato	Kufri Jyoti, Kufri Swarna, Kufri Giriraj, Kufri Himalini, Kufri Himsona
Potato-cabbage-carrot	-do-



### *Cropping systems and suitable potato varieties*

The productivity and profitability of the cropping systems including potato hinges upon the most appropriate choice of potato variety. Most important cropping systems and suitable potato varieties for each in different potato growing zones of India is listed (Table 1). Distinctive feature and constraints in various regions having a bearing on choice of varieties is briefly outlined here.

#### **North-western plains**

Potato is mainly grown as irrigated autumn/winter crop for both ware and seed purposes. The crop planted in relatively warmer conditions (mid September to October) proceeds into very short days and severe winter conditions towards maturity. Frosting and late blight are the major problems.

#### **West-central plains**

Potato is mainly grown as irrigated winter crop for ware and seed purposes. The climatic conditions in this region are milder than north-western plains conducive for higher yield. Major problem is late blight with relatively reduced risk of frost.

#### **North-eastern plains**

Potato is a winter crop in this region with optimal weather conditions for extended periods ensuring high productivity. The salient weather features are mild winters with bright sunshine, few cloudy days. Crop occasionally suffers from late blight and frost is non-existent.

#### **Plateau region**

Potato is grown as rain-fed summer crop from July to September and as an irrigated winter crop (November to February). High minimum

temperature and low sunshine hours limits tuber yield during the rainy season. Onset of rains is crucial for start of planting operation. After rainy season potato, the time of cessation of rains and the time of onset of summers limit the growing period of potato.

#### **North-western hills**

Summer crop of potato is grown from March/April to September under rainfed conditions in high hills (>2742m msl). In Lahaul Spiti and Kinnaur valleys, summer crop is taken from May to September under irrigated conditions. In these hills high rainfall, low sunshine and severe late blight are the major determinants.

#### **North-eastern hills**

Two crops of potato in summer and autumn seasons are grown. Excessive rainfall (3135-4450 mm) with associated problems of acidic soils, and diseases and pests are the major constraints. Late blight disease is a perpetual problem in the region.

#### **Sikkim and West Bengal hills**

Potato is grown in both autumn and spring. The hills in Darjeeling, West Bengal suffer from wart disease and resistant variety like Kufri Kanchan does well. Cloudy weather with excessive rainfall is the main problem.

#### **Future thrust**

- Technical feasibility of several new cropping systems with potato has been demonstrated. Intensification and adaptation of these systems in different agro-ecosystems is needed.
- For wider adaptability, fine-tuning of the package of practices of potato based cropping system in different regions is required to ensure long term sustainability.
- The impact of global climate change on potato production and cropping systems in India needs to be assessed urgently for timely action.
- Inclusion of potato in agro-forestry, horticulture, medicinal and aromatic plants based inter and sequential cropping systems needs to be explored for intensification of potato in India.

#### **Southern hills (Nilgiris in Tamil Nadu)**

The crop is grown through the year during summer and autumn under rainfed and in spring under irrigated conditions. The summer crop suffers from mild water stress in early stages, while autumn crop often suffers from poor sunshine and excess moisture. Nematode infestation in the soils and occurrence late blight limit choice of varieties.

#### **Conclusions**

India needs to produce more potato than at present. Increase in production is possible only through intensification of cropping systems by including potato. Synergy between potato varieties and cropping systems is essential for intensification in widely diverse cropping situations prevailing in India. Central potato Research Institute, Shimla has bred 41 potato varieties with various desirable attributes to offer multiple choice of varieties in widely varying cropping situations in India. Inclusion of potato in the cropping system with crops like cereals, oilseeds, pulses, vegetables or other horticultural/medicinal crops improves productivity and profitability.

- JP Singh, SS Lal & SK Pandey

## हिन्दी समाचार

**केन्द्रीय आलू अनुसंधान संस्थान परिसर, मोदीपुरम एवं आकाशवाणी केन्द्र, नई दिल्ली द्वारा आयोजित आलू उत्पादन : समस्याएँ एवं समाधान पर आधारित फोन-इन-प्रोग्राम के समापन पर आयोजित प्रशिक्षण कार्यक्रम एवं किसान मेले का विवरण**

इस कार्यक्रम को संयुक्त रूप से केन्द्रीय आलू अनुसंधान संस्थान परिसर मोदीपुरम मेरठ द्वारा उत्तर प्रदेश बागवानी मिशन, लखनऊ के सहयोग से एवं आकाशवाणी नई दिल्ली द्वारा संचालित किया गया। यह सम्पूर्ण कार्यक्रम आकाशवाणी नई दिल्ली के इन्द्रप्रस्थ चैनल से 26 अक्टूबर, 2007 से 18 जनवरी, 2008 तक प्रसारित किया गया।

इस प्रोग्राम को उत्तरी भारत के नौ राज्यों (उत्तर प्रदेश, पश्चिम बंगाल, बिहार, हरियाणा, पंजाब, उत्तराखंड, मध्य प्रदेश, राजस्थान और दिल्ली) के आलू उत्पादन करने वाले किसानों द्वारा सुना गया। इसके अन्तर्गत आलू उत्पादन करने वाले विभिन्न किसानों ने आलू उत्पादन, विभिन्न बीमारियाँ, कीट पतंगे, पोषक तत्वों का उपयोग, आलू प्रसंस्करण, बीज उत्पादन, फसलोत्तर तकनीक, कृषि यन्त्रों से सम्बन्धित लगभग 500 प्रश्नों को आलू के विभिन्न विशेषज्ञों से पूछकर अपनी समस्याओं का समाधान किया।

इस फोन-इन-कार्यक्रम के समापन अवसर पर दिनांक 8-9 फरवरी, 2008 को केन्द्रीय आलू अनुसंधान संस्थान परिसर, मोदीपुरम में एक दो दिवसीय किसान मेला एवं प्रदर्शनी का आयोजन किया गया। इस मेले में लगभग 1500 किसानों के अतिरिक्त केन्द्रीय एवं राजकीय सरकार के विभिन्न विभागों में कार्यरत अधिकारियों एवं कर्मचारियों ने भाग लिया। फोन-इन-प्रोग्राम में भाग लेने वाले पंजीकृत किसान भी इस प्रोग्राम में सम्मिलित थे।



किसान मेले में शामिल किसान

मेले का उद्घाटन माननीय डॉ. एच.पी. सिंह, उपमहानिदेशक (बागवानी), भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के कर कमलों द्वारा किया गया। इस अवसर पर बोलते हुये उन्होंने कहा कि किसानों को ज्ञान पर आधारित खेती करनी चाहिये और वैज्ञानिकों के बताये हुये रास्ते पर चलना चाहिये। उन्हें अपने खेतों में मधु-मक्खी व केंचुओं का पालन करना चाहिये। ताकि उन्हें खेती के साथ-साथ इनसे भी आमदनी हो सके। उन्होंने यह भी बताया कि यदि बीज अच्छा होगा तो निःसन्देह फसल भी अच्छी होगी। किसानों को मिलावटी बीज का प्रयोग नहीं करना

चाहिये। इसी तरह किसानों को अपने खेतों में पानी का ज्यादा प्रयोग नहीं करना चाहिये। इससे पानी के साथ-साथ बिजली की भी बचत होगी। उन्होंने कहा कि कृषि योग्य भूमि के घटने के साथ-साथ आज देश की आबादी बढ़ रही है। इसके लिये किसानों को अपनी सीमित भूमि में अधिक पैदावार करने की आवश्यकता है। इससे पहले डॉ. एच. पी. सिंह ने कार्यक्रम की अध्यक्षता करते हुये केन्द्रीय आलू अनुसंधान संस्थान के प्रयासों की सराहना करते हुये कहा कि हमें चिप्स व फ्रेंच फ्राईज जैसे प्रोसेसिंग के उत्पाद तैयार करने चाहिये।



किसान मेले में डॉ. एच.पी. सिंह,  
उपमहानिदेशक (बागवानी)

संस्थान के निदेशक डा. सुमन कुमार पाण्डेय ने बताया कि संस्थान ने आलू की कई किस्में विकसित की हैं। इस सन्दर्भ में उन्होंने कुफरी पुखराज, कुफरी सदाबहार, कुफरी सूर्या, कुफरी हिमसोना व कुफरी चिप्सोना-3 का विशेष रूप से उल्लेख करते हुये इन किस्मों की विशेषताओं पर प्रकाश डाला। उन्होंने कहा कि हमारा प्रयास रहेगा कि इसका बीज जल्द ही किसानों तक पहुंचे। परिसर के संयुक्त

निदेशक डॉ. बीरपाल सिंह ने सभी किसानों व अतिथियों का स्वागत करते हुये इस मेले की विस्तृत जानकारी दी और माननीय मुख्य अतिथि के कार्यों की सराहना करते हुये उनके उल्लेखनीय योगदान के लिये धन्यवाद प्रस्ताव दिया। इस अवसर पर आकाशवाणी, नई दिल्ली के कार्यक्रम अधिशासी श्री डी.डी. बंसवाल, मैरिनो इण्डस्ट्रीज हापुड से श्री प्रकाश लोहिया, व अन्तर्राष्ट्रीय आलू केन्द्र, नई दिल्ली के वैज्ञानिक डॉ. एम.एस. कादियान ने भी किसानों को सम्बोधित किया। इस अवसर पर आलू उत्पादन-समस्याएँ एवं समाधान प्रसार पुस्तिका, भू-भारती-कृषि एवं ग्रामीण विकास मासिक हिन्दी पत्रिका आलू विशेषांक, आलू विधायन मार्गदर्शिका, ढेर व गड्डों में आलू का सुधरा भण्डारण जैसी चार पुस्तकों का विमोचन किया गया। इस अवसर पर एक विशाल प्रदर्शनी का भी आयोजन किया गया जिसमें लगभग 50 स्टॉल लगाये गये। किसानों ने इस प्रदर्शनी में विशेष रुचि लेते हुये प्रदर्शनी का भरपूर फायदा उठाया।

दोपहर के सत्र में किसानों के लिये विशेष तौर पर एक किसान गोष्ठी



किसान मेले में पुस्तकों का विमोचन

आयोजित की गयी। जिनमें किसानों की जिज्ञासाओं व समस्याओं से सम्बन्धित प्रश्नों का मौके पर ही समाधान किया गया। इन प्रदर्शनियों में बीज आलू उत्पादन तकनीकी, आलू की प्रसंस्करण प्रजातियाँ, आलू फसलोत्पादन, आदि विषय पर किसानों को विशेष रूप से जानकारी दी गयी। तीसरे सत्र में आकाशवाणी, नई दिल्ली के सांस्कृतिक कलाकारों ने एक विशेष लोक सांस्कृतिक कार्यक्रम आयोजित कर कार्यक्रम में एक नई छटा बिखेर दी।

दो दिनों से चले आ रहे इस किसान मेले व प्रशिक्षण कार्यक्रम का 9 फरवरी, 2008 को समापन समारोह के अवसर पर मुख्य अतिथि के रूप में आये आकाशवाणी नई दिल्ली के केन्द्रीय निदेशक श्री श्रीवर्द्धन कपिल ने अपने भाषण में किसानों का सम्बोधित करते हुए बताया कि प्रयोगशाला से खेत तक के सफर में बहुत से सवाल किसानों के मन में उठते हैं। आवाज के माध्यम से आकाशवाणी का यह प्रयास रहता है कि वैज्ञानिकों की बातों को किसानों तक पहुंचा सकें। उन्होंने कहा कि आकाशवाणी से प्रसारित होने वाले कृषि कार्यक्रमों को कई कृषक प्रति दिन सुनते हैं और उन्हें आज के वैज्ञानिक युग में हजारों पत्र रोजाना प्राप्त होते हैं। इस उद्देश्य को लेकर किसान मेले का यह आयोजन सफल रहा। कार्यक्रम की अध्यक्षता करते हुए भारतीय कृषि अनुसंधान परिषद के सहायक महानिदेशक डा. उमेश श्रीवास्तव ने किसानों को आलू के बारे में विस्तार से जानकारी दी। इस

अवसर पर केन्द्रीय आलू अनुसंधान संस्थान की वार्षिक राजभाषा पत्रिका समाहित व न्यूज लेटर का विमोचन भी किया गया। आकाशवाणी से प्रसारित फोन-इन-कार्यक्रम में किसानों द्वारा पूछे गये सर्वश्रेष्ठ प्रश्नों के लिए किसानों को पुरस्कार वितरित किये गये। तत्पश्चात् कार्यक्रम के अन्त में संस्थान के संयुक्त निदेशक, डा. बीरपाल सिंह ने कार्यक्रम की रूपरेखा की जानकारी देते हुए बताया कि दो वर्ष पहले रेडियो पाठशाला कार्यक्रम के दौरान यह सवाल उठा था कि किसानों की समस्या का समाधान फोन-इन-कार्यक्रम के माध्यम से किया जाये। इसीलिए इस कार्यक्रम के समापन समारोह के अवसर पर मोदीपुरम में किसानों के लिए किसान मेला व प्रशिक्षण कार्यक्रम का आयोजन किया गया।

**एन.ए.आई.पी. परियोजना 'वैल्यू चेन ऑन पोटेटो एन्ड पोटेटो प्रॉडक्ट्स' की दिनांक 15 मई, 2008 को केन्द्रीय आलू अनुसंधान संस्थान परिसर, मोदीपुरम, मेरठ पर आयोजित उद्घाटन कार्यशाला का संक्षिप्त विवरण**

केन्द्रीय आलू अनुसंधान संस्थान परिसर, मोदीपुरम में दिनांक 15 मई, 2008 को राष्ट्रीय कृषि नवीनीकरण परियोजना द्वारा स्वीकृत "आलू एवं आलू उत्पादों पर वैल्यू चेन प्रारम्भ" कार्यशाला का उद्घाटन किया गया। कार्यशाला का उद्घाटन, माननीय डा. एच.पी. सिंह, उपमहानिदेशक (उद्यान), भारतीय कृषि अनुसंधान परिषद के द्वारा किया गया। इस अवसर पर उन्होंने देश



संस्थान के निदेशक का सम्बोधन



कार्यशाला में सम्मिलित प्रतिनिधि

में विषाणुमुक्त आलू बीज उत्पादन तथा आलू के प्रसंस्करण को बढ़ावा देने की आवश्यकता पर बल दिया। इस अवसर पर केन्द्रीय आलू अनुसंधान संस्थान के निदेशक डा. सुमन कुमार पाण्डेय ने अपने सम्बोधन में इस परियोजना में शामिल होने वाले निजी, पब्लिक एवं सरकारी संस्थानों के लगभग 35 प्रतिनिधियों से इस परियोजना में पूरी तत्परता से कार्य करने का अनुरोध किया ताकि यह परियोजना सफल हो सके तथा देश की कृषि व्यवस्था को इसका पूरा लाभ मिल सके।

इस कार्यशाला में केन्द्रीय फसलोत्तर प्रौद्योगिकी एवं तकनीकी अनुसंधान संस्थान लुधियाना, टाटा एनर्जी रिसर्च इन्स्टीट्यूट, नई दिल्ली, मेरिनो इण्डस्ट्रीज हापुड, यूनाइटेड फास्फोरस लिमिटेड, मुंबई, भट्टी सीड्स फार्म, जालन्धर, सतनाम एग्रोटेक जालन्धर (पंजाब) आदि के प्रतिनिधियों ने परियोजना के क्रियान्वयन हेतु विचार विमर्श किया। इस कार्यशाला में एन.ए.आई.पी. के राष्ट्रीय समन्वयक डा. जे. पी. मित्तल ने एन.ए. आई.पी. की आवश्यकता एवं भारतीय कृषि में इसके महत्व पर अपने विचार रखे।

परिसर के संयुक्त निदेशक व इस परियोजना के मुख्य अनुवेशक डा. बीरपाल सिंह ने परियोजना के बारे में विस्तृत जानकारी दी तथा कार्यशाला में भाग लेने वाले समस्त प्रतिनिधियों एवं वैज्ञानिकों का स्वागत किया। इस परियोजना के माध्यम से देश में प्रथम बार कृषि अनुसंधान में निजी क्षेत्र की भागीदारी सुनिश्चित की गयी है। इसके अन्तर्गत निजी एवं सार्वजनिक संस्थानों की भागीदारी देश के किसानों की आर्थिक स्थिति को सुधारने के लिए एवं कृषि आधारित उद्योगों को प्रोत्साहित करने के लिए उत्प्रेरक सिद्ध होगी।

कार्यशाला के समापन पर डा. देवेन्द्र कुमार, वरिष्ठ वैज्ञानिक ने सभी आगन्तुकों का धन्यवाद किया।

— बीरपाल सिंह, संयुक्त निदेशक

**Printed :**

July 2008 (500 copies)

**Editorial Committee :**

Brajesh Singh, Anil Kumar, Avnish Atrey

**Published by :**

Dr. S.K. Pandey

**Director, Central Potato Research Institute  
Shimla-171 001, Himachal Pradesh, India**

Phone: 0177-2625073, Fax: 177-2624460

E-mail: dircpri@sancharnet.in

**Printed at :**

Nirmal Vijay Printers, New Delhi-110 028; Phones : 25891449, 45576780 Mobile : 9811053617