



केन्द्रीय आलू अनुसंधान संस्थान Central Potato Research Institute Newsletter

Number 39

December, 2008

From the Director's Desk



Potato is a valuable cash crop for millions of farmers and a food security crop for low-income farmers. The poorest and most undernourished farm households depend on potatoes as a primary or secondary source of food and nutrition. This is especially significant for the North-eastern parts of India where the crop occupies a major niche in the cropping pattern and significantly contributes to the agrarian economy of the region. The consumption pattern of potatoes in the NE region is also significant as they are consumed in boiled and roasted form, both singly and with other vegetables and meat in all three meals of the day. The highest per capita potato consumption is seen in the state of

Meghalaya and is estimated at 93 kg/year as compared to the national average of about 17 kg/year.

The suitability of the region for potato cultivation was recognized way back in 1830 when the potatoes grown in the hills of Cherrapunjee (now Sohra) were assessed as the best during a Horticultural show in Kolkata. Potato is an important crop of the NE region and is grown in all the 8 states of the region, accounting for nearly 10% of the country's total potato area, but the contribution to the country's production is very low. Potato yield in all NE states except Tripura (18.5 t/ha) has been low (4-8 t/ha) as compared to the national average of 18.2 t/ha. The main reasons for low yield in the NE region are inadequate availability of healthy seed, poor management practices, cloudy conditions during crop growth, heavy precipitation during tuberisation and harvest, presence of serious diseases like late blight and bacterial wilt and heavy rottage in stores. Moreover, potato is grown mainly under rainfed condition in hilly terrain in steep heavy slopes or terraces.

CPRI through its station at Upper Shillong, Meghalaya has been working towards developing potato varieties, production, protection and post harvest technologies to augment potato production in the region to ensure sustainable agricultural development with food security. The present scenario and prospects for potato cultivation in the North Eastern region is showcased in this newsletter to encourage the potato farmers of the region.

ISSUE HIGHLIGHTS

| | |
|----------------------------------|----|
| From the Director's Desk | 1 |
| Research Highlight | 2 |
| Training & Technology Transfer | 3 |
| Important Meetings | 5 |
| Invited Lectures & Visitors | 10 |
| Human Resource | 11 |
| Honours, Awards & Foreign visits | 11 |
| Future Activities | 12 |
| Potato Facts | 12 |
| Articles on Potato | 13 |
| हिन्दी समाचार | 17 |

Research Highlights

Development of Decision Support Tools

The vital informations like optimum time of planting, the most suitable variety and the expected yield at different dates of harvest etc. are required by farmers for scheduling their planting and harvesting times as well as for choosing the variety to be grown. Since obtaining such information for all the regions where potato is grown requires extensive experimentation which involves considerable time and money, these have been generated through models and stored in a database.

This Decision Support System has been developed to access this database and would:

- Provide information on the expected yields of different varieties planted at different times to help identify the most suitable one for locations in India.
- Help decide the time of harvest based on yield accrued at 60, 70, 80 and 90 days after planting.
- Indicate the varietal performance under different dates of planting and crop durations and thus help choose the appropriate variety.

This DSS has been developed at the Division of Crop Production, Central Potato Research Institute, Shimla by PM Govindakrishnan, Shashi Rawat, SK Pandey, JP Singh, SS Lal and VK Dua.

The Potato Pest Manager

Decision support tools for diseases/pest management of potato is very important because not only they reduce yield/quality but some of them may wipe out the whole crop within a few days, if timely action is not taken. Further, there is danger of indiscriminate use of chemicals as well as economic loss in case of excess/wrong use. A simple tool has been developed for the identification and control of 17 potato diseases and pests prevalent in India. This DSS has been developed at the Division of Crop Production, Central Potato Research Institute, Shimla by PM Govindakrishnan, SK Pandey, SM Paul Khurana, Sarjeet Singh, VK Chandla, Islam Ahmad, Shashi Rawat, SS Lal and VK Dua.

Kufri Khyati: A new early maturing variety for Indian plains

Hybrid J.93-86 has been released and notified as variety Kufri



Foliage and tubers of Kufri Khyati

Khyati in 2008 by the Central Sub-Committee for Crop Standards, Notification and Release of Varieties, Ministry of Agriculture, Government of India, for its general cultivation in Indo-Gangetic plains of the country. Kufri Khyati is a high yielding, early bulking, white tuber variety with moderate resistance to late blight. Generally most of the early maturing varieties are highly susceptible to late blight. This hybrid, however, combines high yield under short crop duration with moderate resistance to late blight. The late blight tolerance characteristics of this hybrid will be useful in preventing drastic reduction in yield in the crop seasons when late blight disease appears in epiphytotic conditions.

This variety performs well for yield at 60 and 75 days in the entire plains of India including northern plains, eastern plains and central plains. The specific areas for its adaptation are Rajasthan, Haryana, Punjab, Uttar Pradesh, Bihar, West Bengal, Gujarat, Madhya Pradesh, Orissa and Chhatisgarh. This variety is likely to be a good replacement for early maturing cultivars like Kufri Chandramukhi, Kufri Jawahar, Kufri Ashoka and Kufri Pukhraj. In Indian sub-tropical plains, potato competes with wheat as both are grown in rabi crop season. For further increase in area under potato and better competition of the crop in intensive agriculture, short duration varieties are required. Short duration varieties like Kufri Khyati can allow growing potato-wheat as sequential crops.

- Raj Kumar, G.S. Kang, S.K. Pandey & Jai Gopal

On-farm demonstration of improved heap storage technology for table and processing potatoes

Heap storage of potatoes is commonly practiced in many states of India to avoid distress sale at harvest, but the losses in stored potatoes are generally enormous (15-25%). Considering the gravity of the problem, CPRI conducted extensive studies during the last 4-5 years to improve its efficiency. An improved heap storage technology involving essential pre- and post-harvest measures, viz., tuber maturity and haulm cutting prior to harvest, curing and selection of potatoes prior to storage, providing ventilation during storage and sprout inhibition with the use of CIPC (isopropyl N-(3-chlorophenyl) carbamate) has been developed. The technology was demonstrated in farmers' fields at 4 locations in Punjab during March to June, 2008 for storage of table and processing potatoes which was a big success.



Meeting with farmers

Well cured undamaged, healthy tubers of popular variety of the region Kufri Pukhraj were stored for table purpose under the shade of trees in Sultanpur (Jalandhar district.) and of processing variety Kufri Chipsona-1 in collaboration with the

processing industry (Satnam Agri Products Ltd, Jalandhar) under high sheds made of asbestos sheets in cold storage *varanda*/shade of trees in three villages of Punjab, viz., Badshahpur (Jalandhar district), Shamchaurassi (Hoshiarpur district.) and Khatkar Kalan (Nawanshar district).

Potatoes were spread in thin layers and perforated PVC pipes were placed in the centre at 4-5 ft distance. CIPC (trade name Oorja, UPL, Mumbai, 50 % a.i.) was uniformly sprayed in methanol @ 40 ml tonne¹ (dissolved in 1 litre of methanol) with a knapsack sprayer. After the treatment, the potatoes were collected in the shape of a conical heap and covered with 30-60 cm thick layer of locally available material such as *pural*. Separate heaps with and without CIPC spray treatment were laid.



CIPC treated



Untreated

Condition of tubers after 90 days of storage

CIPC treatment inhibited sprouting and significantly reduced

sprout growth and total losses in tubers up to 90 days of storage from March to June. Total losses in CIPC treated potatoes ranged between 4-5% as compared to 11-12% in control. Treated potatoes remained firm and sprout free whereas untreated (control) potatoes multiple sprouts and shriveled. In processing cv. Kufri Chipsona-1, reducing sugar concentrations decreased from 155 to 34 mg/100 g fr. wt. during storage up to 110 days and chip colour improved significantly and these were found highly acceptable for processing. Potatoes were successfully used in making good quality flakes and French fries up to the end of June. The treated tubers were also analyzed in the laboratory for CIPC residues, which were found to be under the permissible limits, thus tubers were safe for human consumption.

The demonstrations clearly established that improved heap storage technology can be safely used by the farmers and the potato industry (i) to increase remunerations from potato cultivation and (ii) to maintain the desirable quality of table and processing potatoes for 3-4 months after harvest at lower storage cost.

-Ashiv Mehta, Brajesh Singh
& R Ezekiel

Training & Technology Transfer

Farmers' training at Shimla

A farmers' training on "Improved Techniques of Seed Potato Production and Post-harvest Technologies" was organized during

8-10 July, 2008 by the Division of Social Sciences at CPRI, Shimla. Although the research Institute like CPRI has been entrusted with conducting trainers' training, this type of arrangement has borne limited success in effecting technology transfer to the farmers owing to inefficiency and lack of professional approach at the state level. Hence, the Institute has started this type of activity to reduce the distortion in technology dissemination.



Registration of farmers for training at Shimla

The training was organized for the farmers of Himachal Pradesh in which 16 farmers from 6 major potato growing districts of the state, namely Shimla, Mandi, Sirmaur, Solan, Kullu & Hamirpur participated. During this training course, farmers were given series of lectures consisting of late blight management, PTM & white grub management, healthy seed potato production, seed certification, marketing and strategies for adoption of potato technologies. A field visit to CPRS, Kufri was also organized for the farmers on this occasion.

Model Training Course

A model training course on "Potato Improvement, Production & Utilization in the Current Indian Scenario" was organized during 16-23 Sept., 2008 at CPRI, Shimla. The training course was sponsored by Directorate of Extension, Ministry

of Agriculture, Govt. of India. The objectives of the training course were, improving the knowledge of the trainee officers regarding seed potato production and certification, improving the skill of the trainee officers regarding seed potato production, and obtaining the feedback from the trainee officers regarding field problems in the adoption of potato production technologies and in the seed certification.



State Extension Officers attending MTC at Shimla

Sixteen (16) extension officers from 9 state departments of agriculture/ horticulture, namely Himachal Pradesh, Haryana, Uttar Pradesh, Gujarat, Jharkhand, West Bengal, Assam, Sikkim and Maharashtra participated in this training course. The training included lecture-cum-discussions, practical sessions, skill demonstrations, field visits and video film shows. In all, 22 lectures were delivered and a field visit to CPRI farm at Kufri was organized during the training course. Pre- and post-training evaluation of the trainees was conducted which revealed 13 per cent improvement in knowledge of the participants.

Monitoring of NABARD RIF Project at CPRS, Shillong

Central Potato Research Station, Shillong is implementing NABARD Rural Innovation Fund (RIF) project on "Popularising of

Low Cost Storage Technology for Table Potato and Potato Seed" in four villages of East Khasi Hills district of Meghalaya. A team from NABARD headquarter Mumbai visited the station on 17th September, 2009 to monitor the project. The team comprised of Mr. B. Jayaraman, General Manager (DEAR); Mr. A. D. Javalekar, Manager; Mr. R. K. Shelar, Manager from NABARD, Mumbai; Mr. N. J. Mupid, AGM; and Mr. S. D. Waghmare, AGM, NABARD from Meghalaya Regional Office, Shillong and Dr. T. Haque, Ex-Chairman, Agriculture Cost & Price Commission and Consultant, Swiss Development Corporation (SDC). Dr. S. Ramani, Head of station apprised the visitors about the station and its various activities and the activities undertaken in the project. The team alongwith the Head of station and the principal investigator of the project visited the community level seed storage structure and household level storage structure for table potatoes in the project villages. They also interacted with the farmers nominated in this project by the respective village heads and received positive feedback. The work done in this project was highly appreciated by the visitors. The monitoring team met the members of Myliem Potato Farmers' Club, which has been promoted by Central Potato Research Station, Shillong.

Training to PepsiCo Staff

2-days training course on "Recent Techniques in Quality Seed Potato Production" for the staff of PepsiCo India Holding Pvt. Ltd. (FritoLay Division, Gurgaon) was organized at CPRI, Shimla during 31 July -1 Aug., 2008. In this training course, the trainees were delivered

lectures on quality seed potato production, integrated nutrient management for processing potatoes, agronomic practices for potato production for processing purpose and post-harvest technology. The training was attended by 16 participants who were also exposed to a field visit to CPRS, Kufri/Fagu during training course.

Aloo Pathshala on AIR, Shimla completed

The Division of Social Sciences organized Aloo Pathshala (Potato School) on All India Radio, Shimla to commemorate the International Year of Potato 2008. In this programme, 20 talks on "Recent potato technologies were broadcast from 15 March to 26 July, 2008. At the end of each talk, a question related to that talk was asked from the farmers who were supposed to send their answers on a postcard. An overwhelming response from the farmers was obtained who also provided feedback about the programme and about various potato technologies developed by the Institute. During this programme, a jingle on potato was also broadcast at the beginning and end of each talk which highlighted the nutritive value of potato and also educated the public on the popular misconceptions about potato.

Farmers' training at CPRS, Shillong

An on-station farmers' training on "Improved Potato Production and Protection Technologies" was organized at CPRS, Shillong on August 12, 2008 in which 50 farmers participated. Two training programmes for farmers on "Improved Potato Production, Protection and Post-harvest

technology" under MM-1 were organized during 17-18 October, 2008 at ICAR Research Complex for North-eastern region, Manipur Centre, Imphal and during 21-22 October, 2008 at ICAR Research Complex for North-eastern region, Tripura Centre, Agartala in which 60 farmers participated.



Training programme in Lembucherra, Tripura

A one-day training programme for 41 farmers on "Improved Potato Production, Protection and Post Harvest technology" under MM-1 was also organized on 12th November, 2008 at IIT, Nalbari, Assam.

Participation in Kisan Mela

CPRS, Patna participated and put up an exhibition stall in "Krishi evam krishak vikas karmshala-sab-pradarshani rabi 2008" inaugurated by Sh. Nitish Kumar, Hon'ble Chief Minister of Bihar and organized by Govt. of Bihar at Gandhi Maidan, Patna during 16-20 October, 2008. Drs. RP Rai, Barsati Lal, TK Sinha, Sh. Yogesh and Sh. Arjun Kumar Sharma participated in the programme.

Live Phone-in programme on Doordarshan

Drs. RP Rai and Shambhu Kumar of CPRS, Patna participated in Live phone-in programme on "Aloo ki kheti ki mukhya batein" on October 21, 2008 at Doordarshan,

Patna. Dr. Barsati Lal, Scientist (SS) of CPRS, Patna participated in Doordarshan Programme, "Satya aloo beej ki kheti se labh" and "Krishi vikas mein krishi vaigyanikon ki bhumiika" under the programme "Krishi Darshan and Gaon Ghar".

Important Meetings

Global Potato Conference-2008

Indian Potato Association, Shimla along with Central Potato Research Institute, Shimla and Indian Council of Agricultural Research, Govt. of India, New Delhi celebrated the "International Year of the Potato" by organizing a Global Potato Conference in New Delhi during 9-12 December, 2008. The year 2008-09 also happens to be the Diamond Jubilee year of CPRI, Shimla. The conference was sponsored by a group of 24 public and private institutions from India and abroad. It was attended by over 550 delegates from more than 30 countries like USA, UK, Germany, The Netherlands, Canada, Australia, Japan, Sweden, Hungary, Argentina, Peru, Chile, Uganda, Bangladesh, Sri Lanka, Pakistan, Bhutan, Nepal, central Asian countries, etc. Besides, a mega exhibition was held at the conference venue to showcase the strength of technologies and inputs in facilitating sustainable agriculture with special emphasis on potato.



Inaugural session of GPC-2008 at Vigyan Bhavan

The conference was inaugurated by the Hon'ble Union Minister of Agriculture and Consumer Affairs, Food & Public Distribution Sh. Sharad Pawar on 9th December, 2008 in the Plenary Hall of Vigyan Bhavan, New Delhi. Dr. Mangala Rai, Secretary, DARE & DG, ICAR; Sh. Nanda Kumar, Secretary, DAC, GOI; Dr. Pamela Anderson, DG, CIP; Dr. Gavin Wall, FAO Representative in India; Dr. H.P. Singh, DDG (Hort.), ICAR and Dr. S.K. Pandey, Director, CPRI were also present in the inaugural function. The Hon'ble Union Minister of Agriculture emphasized on the role of horticulture as the best option for crop diversification. He also elaborated the success of potato research & development in India and challenges ahead. Dr. Mangala Rai, DG, ICAR stressed the importance of developing varieties with novel traits, application of biotechnology for breaking the yield barrier, production of quality planting materials, efficient management of natural resources, and better utilization of potato. Dr. Gavin Wall, FAO Representative in India elaborated the purpose of declaring the year 2008 as the International Year of the Potato. Dr. Pamela Anderson, DG, CIP emphasized on the role of potato as a vehicle for poverty alleviation and as an antidote for global food price crisis.



Release of CPRI bulletins by Hon'ble Union Agriculture Minister, Sh. Sharad Pawar

There were nine technical sessions, viz., (i) genetic resource management for crop improvement, (ii) potato genomics and biotechnology, (iii) resource management for sustainable production, (iv) potato health management, (v) late blight- the perpetual challenge, (vi) seed production and management, (vii) post-harvest management and value addition, (viii) technology transfer and social concerns, (ix) potato trade and industry, and one satellite meeting on RB gene technology for late blight management. There were 75 invited lectures in different sessions out of which about 50 were from outside India. Besides, there were 284 research papers presented as posters during the conference. The technical sessions were held during 10-12 December, 2008 at National Agricultural Science Centre Complex, Dev Prakash Shashtri Marg, New Delhi. The major recommendations of the conference are as follows:

- Commercial potato varieties throughout the world suffer from narrow genetic base, thereby seriously endangering them from unpredictable biotic and abiotic stresses. A long-term global commitment is needed to broaden the genetic base of potato varieties through conventional and/or molecular breeding approaches.
- Transgenics for resistance to late blight, bacterial wilt, tuber moth and for better nutritional and processing quality have been developed by several countries. Food and environment safety of promising transgenic lines should be studied on priority as per national regulatory requirements of different countries.
- The potato genome sequencing is being done by a multinational consortium and hopefully the entire sequence of 840 Mbp potato genome will be available by 2010. Gene annotation for potato genome should be initiated as soon as draft sequence is prepared followed by functional validation of each gene by an international community.
- Preliminary results indicate that there will be significant yield loss with increase in temperature due to global climate change. Proper assessment of climate change should be done and emphasis should be given on adaptation and mitigation research.
- Application of space technology along with the geographical information system has emerged as powerful tool and must be exploited for site suitability analysis, crop assessment and monitoring, providing information on cropping system and post-harvest management planning to support the decisions in potato production.
- The late blight pathogen *Phytophthora infestans* is known to adapt very quickly to changing environment. Global warming may lead to development and selection of pathogen strains to higher temperature regimes which may further risk the outbreak of late blight in warmer areas. Therefore, there is need to monitor and study *P. infestans* population structure on a regular basis using modern molecular tools and disease reaction.

- Several developing countries including India have developed region specific 'decision rules' for forecasting late blight. It would be appropriate to convert them into web-based late blight forecasting systems using regional weather data.
- Emerging potato diseases like Zebra chip disease in North and Central America, and Yellow vein virus in Andes may pose serious threats to global potato sector. Strict quarantine should be enforced to curtail their international movement.
- Cold storage involves substantial cost and farmers of the poor Asian countries cannot afford the high storage cost. There are a number of traditional low-cost and non-refrigerated storage structures that do not require electric energy and are suitable to store potatoes for 3-4 months. These traditional structures with or without CIPC treatment and other modifications should be popularized and encouraged.
- For increasing the international trade of potato, there is need for enhanced knowledge sharing among the countries and barriers to be broken. There is need for evolution of a mechanism for easier movement of potato and potato products among SAARC countries.

During the Plenary Session of Global Potato Conference 2008, awards were given to 10 best potato growers and 8 best potato entrepreneurs of the country. The Regional Vice-Presidents of IPA identified the names of the progressive potato growers from

major potato growing states for this award. The awardee farmers were Sh. HS Sangha (Punjab), Tek Chand (HP), Arvind Bhargava (UP), Yogender Pal Singh (UP), Sita Ram Singh (Bihar), Anant Dev Nayek (West Bengal), Dhirender Sarkar (Tripura), MM Gehlot (Gujarat), Sadanand Shivalli (Karnataka) and T Vasu (Tamil Nadu).

The entrepreneurs were selected for the award on the basis of their contribution to the development of potato industries in India. The awardee entrepreneurs were Sh. Rajesh Garg, Rudra Pratap Singh, B. Mazoomdar, Ramanjit Singh, Prakash Lohia, TPS Tomar, Rahul Chaturvedi and SK Tibrewal. Besides, 9 Best Poster Paper Awards were conferred to the presenters during each of the poster sessions of the GPC 2008.

In the evening of December 12, 2008, an annual general body meeting of Indian Potato Association was held in the symposium hall of NASC complex, New Delhi in which about 100 members of IPA participated. In the meeting, the Association conferred Honorary Fellowship to 4 distinguished potato scientists of the world *viz.*, Dr. Pamela Anderson, DG, CIP; Dr. JE Bradshaw, Head (Potato Breeding), SCRI, UK; Dr. SM Paul Khurana, VC, Rani Durgavati University, Jabalpur; and Sh. HS Sanga, farmer of Punjab. The Association also conferred Best Paper Award to a total of 27 recipients for their papers published in Potato Journal in 2004, 2005 and 2006 volumes.

Agro-Tech Exhibition at GPC-2008

On the sidelines of the Global Potato Conference-2008, an agro-

tech exhibition was also organized to showcase the status of potato-based industries and trade, food value chain, food services and retailing, biotechnology, and public-private partnership in technology transfer. Shri Anil Kumar Upadhyay, Additional Secretary, DARE and Secretary, Indian Council of Agricultural Research inaugurated the agro-tech exhibition. Sh. Upadhyay lauded the role of exhibition in enhancing the exposure of farming community to new and relevant technologies ready for adoption.

Secretary, DARE and DG (ICAR), Dr. Mangala Rai, DDG (Hort.), ICAR, Dr. HP Singh, Chairman, ASRB, Dr. CD Mayee and Former DG (ICAR), Dr. RS Paroda also visited the agro-tech exhibition 2008 at the NASC Complex. While appreciating the efforts made by the organizers, Dr. Mangala Rai said that India has the required potato production technologies and the produce is free from major diseases, which provide significant opportunity for export of potato products. He told that the celebration of International Year of the Potato started in India with the organization of India International Potato Expo at Kolkata during 9-11 January, 2008 and concluded with the Global Potato Conference and Agro-tech Exhibition 2008 at New Delhi. Delegate scientists from India and abroad and large number of farmers from adjoining cities also visited the exhibition every day and interacted with the stall officials.

More than 60 organizations of national and international repute put up their stalls to depict the latest trends in agricultural technologies from modern irrigation methods to

processing techniques, and quality seeds to value-added products. All the sponsors and co-sponsors of the Conference, and several other private institutions displayed their technologies and products through the exhibition stalls. Important among them were the Indian Council of Agricultural Research, International Potato Center, National Seed Corporation, National Horticulture Mission of UP, Pepsico Holdings India Pvt. Ltd., Syngenta, Vegit Potato Specialties, Haldiram's, etc. The exhibitions were organized under the guidance of Dr. TP Trivedi, Project Director, DIPA (ICAR) and Dr. PS Naik, Project Coordinator, AICRP (Potato) who took keen interest in this event.



Dignitaries visiting exhibition of potato varieties at CPRI stall

The stall of CPRI was the biggest attraction which provided a glimpse of potato research in India and demonstrated the technologies for production of potato chips, French fries and delicious pickles. The new developed varieties of Central Potato Research Institute attracted large number of farmers. At the stall of ICAR, popular books and CDs were displayed and made available for sale. The newly released book on potato cultivation (Aloo ki kheti) attracted large number of farmers. As an added attraction, a

mini-theater was created at the exhibition to show informative and motivational films on ICAR's technologies and success stories. The exhibition offered an international platform for different corporate and farming community from India and abroad to come together at the world's largest agri-based market to negotiate business deals and secure linkages.

Brain Storming Session on Impact Assessment of Climate Change

A brain storming session on "Impact assessment of climate change for research priority, planning in horticultural crops" was organized during 6-7 September, 2008 at Central Potato Research Institute, Shimla. The session started with invocation ceremony by lighting the lamp by Hon'ble Governor of Himachal Pradesh Her Excellency Smt. Prabha Rau followed by other dignitaries and singing of the invocation song. Dr SK Pandey, Director, CPRI, Shimla extended a warm welcome to the chief guest Hon'ble Governor of Himachal Pradesh Her Excellency Smt. Prabha Rau; the president of the inaugural function, Dr HP Singh, DDG (Hort), ICAR, New Delhi; the Guest of Honour, Dr Mathura Rai, Director, IIVR, Varanasi and distinguished delegates and participants of the brain storming session. In his address he briefed the dignitaries and participants about the activities and achievements of CPRI. The importance of climate change and its impact on horticultural crops in future with implications for food and social security was underlined.

In the inaugural address Smt. Prabha Rau highlighted that i) climate change impacts and adaptation

should be considered in all major development activities, ii) develop new infrastructure, policies and institutions to support the new land use arrangements identified by science and technology, iii) consider financial incentives and package for improved land management including resource conservation /enhancement (water, carbon, energy and fertilizer use efficiency), iv) consider incentives for industry and farming community for developing and adopting Green House Gases inhibiting technologies, v) establish Green Research Fund for strengthening research on adaptation, mitigation and impact assessment.



Hon'ble Governor of HP Smt. Prabha Rau delivering inaugural address at the Brain Storming Session

In his presidential address, DDG (Horticulture) Dr. H.P. Singh provided an overview of climate change, its impacts and also adaptation and mitigation strategies and emphasized upon research needs to face the future challenges including assessment of climate change impacts on horticultural crops, development of crop-based adaptation strategies, identification of gaps in vital information, prioritize research issues from the point of view of farmers, policy planners, scientists, trade and industries. He urged to address i) priority of education, research and development and policy implications for enhancing adaptive capacity of Indian horticulture to climate change,

ii) capacity assessment of Indian horticulture for mitigation of GHG, iii) appropriate short-term and long-term action plans to mitigate the impact of climate change in horticulture which included development of heat and drought tolerant cultivars with the use of innovative technologies including biotechnology, technology for productive use of water and nutrients, production system management adjustable to climate change, strategic management of insect-pests and diseases, protected cultivation, plant architectural management and augmentation for quality.

The Guest of Honour, Dr Mathura Rai, Director, IIVR, Varanasi highlighted the need to understand and assess the vulnerability of horticultural crops to emerging climate change scenarios and emphasized to evolve adaptation measures through research and development.

On this occasion the chief guest Smt. Prabha Rau released a book on 'Impact assessment of climate change for research priority, planning in Horticultural crops followed by the release of a technical bulletin 'Infocrop-Potato : A Model for Simulating Growth and Yield of Potato in the Sub-Tropics'. Thereafter another Technical bulletin 'A Compendium of Climate Based Potato Zones in India was released by DDG (Horticulture), Dr. H.P. Singh. This was followed by the release of another technical bulletin 'Cultural Management of Crops in Potato Based Cropping Systems' in India by the Guest of Honour Dr Mathura Rai.

On this occasion Dr S. Ramanujam Award for block year 2004-2007 in the memory of the



Release of Technical Bulletins of CPRI

founder Director of CPRI, Dr S. Ramanujam was presented by the Hon'ble Governor Smt. Prabha Rau to Drs. SV Singh, SK Pandey, RS Marwaha, BP Singh, Dinesh Kumar and Praveen Kumar for their outstanding Research/ Leadership in potato improvement and production.

The inaugural session ended with the vote of thanks proposed by Dr. SS Lal, Head, Division of Crop Production, CPRI, Shimla. After the inaugural function, the technical sessions were held under the chairmanship of Dr. HP Singh, DDG (Horticulture), ICAR on 6-7 September, 2008 and presentations were made by the scientists on different aspects of climate change on various crops. It was attended by 80 scientists/delegates including directors of different ICAR Institutes/NRCs of Horticulture Division.

Institute Research Council Meeting

The Institute Research Council (IRC) Meeting, 2008 was held at CPRI, Shimla during 23-25 July, 2008. It was attended by 57 scientists from the headquarters and stations. The basic objective of this meeting was to review the achievements of 2007-08 and formulate future plan of work for 2008-09 of different research programmes. Dr. SS Lal, Secretary, IRC welcomed Dr. SK

Pandey, Director, CPRI and Chairman IRC and all the participating scientists from headquarters and regional stations. He also highlighted the major achievements of the Institute during 2007-08. On this occasion Dr. SK Pandey informed the house that the year 2008 was very good for potato production, but at the same time accompanied by lot of problems since the over production of potato leads to glut. He highlighted the need to develop early maturing potato varieties having late blight resistance keeping in view the unpredictable climate change. He praised the good work done by the Scientists of the Institute and suggested modifications in several research projects in the light of recommendations made by RAC meeting held in June, 2008.

Institute Management Committee Meeting

The meeting of the Institute Management Committee was held on September 30, 2008 at CPRI, Shimla. Dr. SK Pandey, Director, CPRI & Chairman, Institute Management Committee welcomed all the members. The Chairman gave a brief resume of progress of organization, improvement, research achievements, other administrative matters of the Institute & regional stations. The Chairman also apprised the Committee Members about the activities of the Revolving Fund Scheme and the proposals made in the XIth Five Year Plan of the Institute. The meeting was attended by other members viz., Dr. Umesh Srivastava, ADG (Hort.), ICAR; Dr. Gurdev Singh, Director of Horticulture, Govt. of HP; Dr. Baldev Singh, Director of Horticulture, Govt. of Punjab; Dr. SD Bhardwaj, Director of Research, UHF, Nauni, Solan; Dr. GS Kang,

Head, CPRS, Jalandhar; Dr. RP Rai, Head, CPRS, Patna; Dr. NK Singh, PS, Biotechnology Centre, IARI, New Delhi; Dr. VG Malathi, PS (Viorology), IARI, New Delhi, Sr. Finance & Accounts Officer, NDRI, Karnal; Sh. DJ Nikam, Pune and Sh. Man Singh, Hathras as Members; and Sh. AK Singh, Sr. AO, CPRI as Member Secretary.

IJSC Meeting

The 8th meeting of Institute Joint Staff Council was held on 1st August, 2008 at CPRS, Patna under the Chairmanship of Dr. SK Pandey, Director, CPRI, Shimla. The meeting was attended by Dr. BP Singh, Joint Director, CPRIC, Modipuram; Sh. AK Singh, SAO; Mrs. Kamlesh Sharma, FAO; Sh. AK Atrey, Technical Officer; Sh. DD Kashyap, UDC; Sh. Roshan Lal, Assistant; Sh. Naresh Chand Sharma, Technical Assistant; Sh. Munna Lal Bharti, Driver; Dr. YP Singh, Tech. Officer; Sh. Mansha Ram, SS G-III; Mrs. Tara Devi, SS G-II as Members; and Sh. AD Sharma, AAO as Member Secretary. Dr. RP Rai, Head, CPRS, Patna was the special invitee for this meeting. Dr. SK Pandey, Chairman highlighted the need to run the Institute's activities efficiently in the light of declining manpower day by day. He thanked the entire staff of the Institute for cooperation and quick disposal of work.

Invited lectures & Visitors

Expert committee for Technology Transfer

An expert committee consisting of 12 members constituted by Govt. of India for developing a mechanism for effective technology transfer under the chairmanship of Dr. S. Kannayan,

visited CPRS, Ooty on December 2, 2008. During the discussions with the scientists, the committee assessed the implementable technologies of the station which are going to be recommended from the State Government.

Visit of Dr. M Mahadevappa to CPRS, Gwalior



Dr. M Mahadevappa visiting CPRS, Gwalior

Dr. M Mahadevappa, Chairman, RAC, CPRI, Shimla, Former Chairman, ASRB, New Delhi and Ex Vice-Chancellor, UAS, Dharwad visited Gwalior on the invitation of Dr. VS Tomar, Vice-

Chancellor of newly opened RVRS Agricultural University, Gwalior on October 29, 2008. During his visit to CPRS, Gwalior he was welcomed by Dr. AK Somani, PS and Acting Head and was introduced with the scientific, technical & administrative staff of the station. Dr. AK Somani briefed him about the station, its mandate, nucleus and breeder seed production, micro and mini-tuber multiplication and on-going research works under various projects. He visited the CPRS farm including C and D blocks. He was very happy to see the management of farm and he suggested that more research work should be done besides seed production.

Scientist meet at CPRI, Shimla

Scientist meet is a regular activity of the Institute, where on Fridays, scientists, technical workers 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 |
|------------|---------------------|--|
| 27.6.2008 | Miss Reena | Molecular markers in plant breeding and genetic analysis |
| 02.7.2008 | Dr A Ratnakar | CERA consortium- Uses, promotion and presentation |
| 11.7.2008 | Mrs. Poonam Chandel | Alloplasmic incompatibility |
| 18.7.2008 | Dr KN Chaudhary | Crop simulation model- Spatial application |
| 02.8.2008 | Dr Devanand Luthria | Environmental and genetic influence on phenolic composition of fruits and vegetables |
| 14.8.2008 | Dr Dindo Campilan | CIP- Regional partnership in south, west and central Asia |
| 22.8.2008 | Dr Jagesh Tiwari | WTO and Indian agriculture |
| 23.8.2008 | Dr TP Trivedi | Information and communication technology in agriculture |
| 01.9.2008 | Mr A Pradhan | NRDC in commercialization of technologies |
| 31.10.2008 | Mr. Devinder Singh | Slexa technology for next generation sequencing |
| 14.11.2008 | Dr Anjan Banerjee | Long distance transport and RNA movement through the phloem of potato plant |

Human Resource

Appointments

| Name | Post | Joined on |
|----------------------|-----------|-----------|
| Eradasappa E. | Scientist | 19.5.2008 |
| Muralidhar Sadavarti | Scientist | 16.5.2008 |
| AK Srivastava | Scientist | 16.5.2008 |

Promotions

| Name | From | To |
|-----------------------|---------------------------|--------------------|
| Scientific | | |
| RR Burman | Scientist SS | Sr. Scientist |
| Arun Pandit | Scientist SS | Sr. Scientist |
| D Sarkar | Sr. Scientist | Pr. Scientist |
| LC Dey | Sr. Scientist | Pr. Scientist |
| Technical | | |
| Munnal Lal | T-5 (FFT) | T-6 |
| Hesting Jyrwa | T-3 (Driver) | T-4 |
| Kuldeep Singh | T-2 (FFT) | T-3 |
| Nirmal Singh | T-2 (Driver) | T-3 |
| Nihal Singh | T-1 (Driver) | T-2 |
| Ram Das | T-1 (Driver) | T-2 |
| Administrative | | |
| Ram Chand | Stenographer Grade III | Personal Assistant |
| Poonam Sood | Sr. Clerk | Assistant |
| Sandeep Verma | LDC | Sr. Clerk |

Technical

Administrative

Supporting

| | | |
|--------------|--------|---------|
| Birmo Devi | SSG II | SSG III |
| Munna | SSG II | SSG III |
| Ranbir Singh | SSG I | SSG II |
| Kallu | SSG I | SSG II |

Transfers

| Name | From | To |
|--------------------------------|----------------|-------------------------|
| N Somasekhar, Sr. Scientist | CPRS, Muthorai | DRR, Hyderabad |
| RR Burman, Scientist (SS) | CPRI, Shimla | IARI, New Delhi |
| Arun Pandit, Scientist (SS) | CPRI, Shimla | CRRI, Cuttack |
| D Sarkar, Sr. Scientist | CPRI, Shimla | CRIJAF, Barrackpore |
| LC Dey, Sr. Scientist | CPRS, Shillong | NRC Orchids, Gangtok |

Retirements

| Name | Post | Retired on |
|---------------|---------------------|------------|
| Sarjeet Singh | Principal Scientist | 31.07.2008 |
| CK Sharma | Senior Scientist | 11.08.2008 |
| DC Chandel | T-7-8 (Artist) | 31.08.2008 |
| Hans Raj | T-4 (Truck driver) | 31.07.2008 |
| Prithi Singh | T-1 | 31.12.2008 |
| Rajbir Singh | SSG III | 31.08.2008 |
| Nain Singh | SSG III | 30.11.2008 |
| Pargan Singh | SSG II | 31.07.2008 |
| Rayappan | SSG I | 31.12.2008 |

Resignation

| Name | Post | Resigned w.e.f. |
|----------------|-----------|-----------------|
| Shyamala Jyoti | Scientist | 23.05.2005 |

Honours, Awards & Foreign visits

Dr. SK Pandey gets NAS Fellowship

Dr. SK Pandey, Director, CPRI has been conferred with the prestigious Fellowship of National Academy of Sciences, Allahabad, India for his contribution in the field of Plant Breeding, particularly in developing potato varieties suited for processing, late blight resistance, drought tolerance and in developing true potato seed varieties. He has been associated with the development of

16 potato varieties including Kufri Giriraj, Kufri Shailaja and Kufri Himalini suited for the hills. On account of 37 years of contribution to potato research and development, Dr. Pandey is the first potato scientist to get this award.

Recognition Award to Dr. Jai Gopal

Dr. Jai Gopal, Head, Crop Improvement has got the Recognition Award of National Academy of Agricultural Sciences, India for his contribution in the field of Plant Improvement for the biennium 2007-08. The award consist

of Citation, a Medal and cash prize of Rs. 50,000/-. He will be given the award at the 9th NAAS Agricultural Science Congress to be held in June, 2009 at Sri Nagar.

Nomination in ICAR Society

One of the contact farmwoman of CPRI, Smt. Asha Kashyap of Village Pawar, Panchayat Thadi (Shoghi), Dist. Shimla, has been nominated as one of the 7 national members in the **Farmers Category** of ICAR Society



by Hon'ble Agril. Minister, Govt. of India for a period of 3 years w.e.f. 9.6.2008 to 8.6.2011. Smt. Asha Kashyap has been closely associated with CPRI since last 12 years for organizing famers and farmwomen in the technology transfer activities of the Institute. She has also been instrumental in the formation of about 600 self-help groups in the villages of Shoghi cluster for different self-employment activities. Her nomination (which was recommended by CPRI) is a great honour to CPRI in the UN's International Year of Potato 2008.

Future Activities

Training to KVK officials

A 3 days training of KVK officials is planned to be held in the month of March, 2009 at CPRI, Shimla. The training shall aim at imparting knowledge to the officials of KVK on specific areas of crop production, protection and post harvest handling in potato for disseminating this knowledge further to the farmers.

Potato Facts

Potatoes score high on newly developed nutritional scoring system

For many years, organizations like the United States Potato Board, the Potato Council and many other associations and companies are working hard to educate the public that potato is a very healthy food. Therefore, a group led by Dr. Katz of the Yale Prevention Research Center, developed an "Overall

Nutritional Quality Index" (ONQI™) or NuVal Score. A single score between 1 and 100 summarizes all nutritional aspects of a food, the higher the number, the healthier. These Researchers developed complex and proprietary algorithm as input for a range of "healthy" and the "unhealthy" substances in the food, that eventually results in a single score. The idea is summarized in the graph below:



This Nuval score is now published for a range of foods including potato as given below:

| Food | Nuval Score | Food | Nuval Score | Food | Nuval Score |
|------------|-------------|-----------|-------------|----------------|-------------|
| Potatoes | 93 | Broccoli | 100 | Salmon | 87 |
| Brown Rice | 82 | Pineapple | 99 | Hamburger | 25 |
| White rice | 57 | Apple | 96 | Dark Chocolate | 10 |
| Pasta | 50 | Skim milk | 91 | Apple pie | 2 |

Potatoes score *better than all meats and fish and better than milk, even if it is skim milk.* Although many vegetables and fruits score higher than potatoes, potatoes score better than grapes, banana, blackberries and Iceberg Lettuce. The system is expected to be introduced shortly - by at least three supermarket chains in the United States.

Source: Internet

Canadian scientists consider potato starch for nutritional and industrial applications

Most cooks are familiar with the thickening properties of corn starch, but potato starch is every bit

as much up to the job, say scientists with Agriculture and Agri-Food Canada (AAFC). They're working on a project to further examine the structural and functional properties of potato starch, improve the nutritional quality of potato foods, and develop new uses for modified potato starch in food processing, pharmaceutical, and industrial applications.

Potato starch is currently being used by the food processing industry as a general thickener, binder, texturizer, anti-caking, or gelling agent. It also shows up in finished products such as snack foods, processed meats, baked goods, noodles, pet foods, shredded cheese, sauces, gravies, and soups. Potato starches are also used in yeast filtration and as additives in the cosmetics and pharmaceutical industries.

Source: Internet

To counter problems of food aid, try potatoes

With governments having trouble feeding the growing number of hungry poor and grain prices fluctuating widely, food scientists are proposing a novel solution for the global food crisis: Let them eat potatoes. Poor countries could grow more potatoes, they say, to supplement or even replace grains that are most often shipped in from far away and are subject to severe market gyrations. Even before a sharp price spike earlier this year, governments in countries from China to Peru to Malawi had begun urging both potato growing and eating as a way to ensure food security and build rural income.

Source: Internet

Cheaper Indian potatoes flood Pakistani markets

Indian potatoes have flooded Pakistani markets during the last couple of months due to its low price as compared with the local commodity. Around 2,000 tonnes of Indian potatoes are being imported through Wagah border daily. The import is continuing despite the availability of new local crop. The high price of the local product in the market is making the imported item a favourite commodity for the importers. Growers and farmers attributed high prices of locally produced potato on account of increasing production cost compared to Indian commodity. In terms of Indian currency, a 50 kg bag of Indian potato costs Rs 70 after reaching Pakistan through Wagah border. "Imported potatoes cost Rs 3 to Rs 3.50 per kg at the wholesale level in Lahore while at retail level it is sold in the range of Rs 5 to Rs 10 per kg depending upon the distance of the city from Lahore," claimed President, Wholesale Vegetable Welfare Association Sabzi Mandi. Pakistani product is available at wholesale level at Rs 10 to Rs 12 per kg, which is far higher as compared to Indian Potatoes. Attributing reasons of high production cost of Pakistani potato, he said they include higher fertiliser rates, increasing seed cost, higher diesel price in Pakistan and costly rates of tractor, which have pushed potato price sharply up.

Source: Internet

New CIPC rates in Britain

Potato Council is urging store managers to review chlorpropham (CIPC) product labels. New application rates are in place and it's vital that applications are carefully planned to ensure they follow label

recommendations. New limits apply to CIPC applications, following a review by PSD. In addition, some products have been re-registered which has resulted in significant label changes. This is the first season of CIPC stewardship and the use of the chemical is going to be under scrutiny both by the regulatory bodies and production protocol auditors. CIPC is now subject to a Maximum Residue Level (MRL) of 10 mg/kg. Up to 36 grammes of CIPC per tonne of treated crop can be applied over a season to potatoes destined for the fresh market. The maximum dose for processed potatoes, including those used for peeling and fish & chip shops, is 63.75 g/tonne.

Source: Internet

Article on Potato

Scenario and prospects of potato cultivation in the north-eastern region

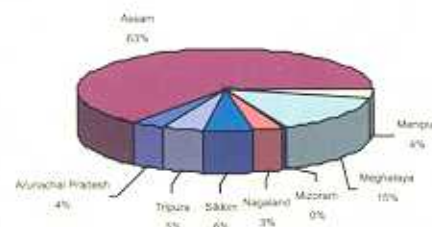
History of potato cultivation in NE states

Potato was introduced into India in the beginning of the 17th Century and was reported to have been cultivated in several parts of the country including the North-eastern parts. However, records show that potato cultivation in this region probably came into existence with the introduction of popular variety 'Khasi' in Meghalaya (then Assam hills) around 1830. A report of the Horticultural Show in Calcutta in 1842 states "... potatoes grown in the hills of Cherrapunjee are still finer" showing the suitability of the NE hills for potato growing. 'Khasi' proved susceptible to late blight and a number of other varieties were

introduced from England and Australia between 1892 and 1946 which were evaluated against some local varieties. After a few years of trials only 'Magnum Bonum' and Darjeeling Red Round (DRR) survived and gave satisfactory yields. Over the years, several trials were conducted involving various exotic and indigenously developed hybrids, but all of them proved a failure in the fight against degenerative diseases and the dreaded late blight. Continuing varietal confusion has been prevalent in the area and suitable varieties to suit the differing agro-climatic conditions in the region have not been developed. The Central Potato Research Station, Shillong, after being established in 1959, addressed the problems related to potato production in this region.

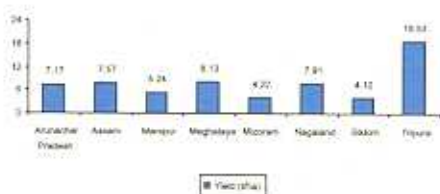
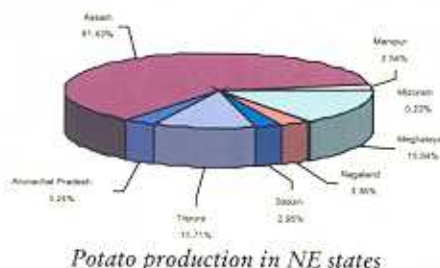
Area, production and productivity

Potato is an important crop of the NE region contributing nearly 10% of the country's total potato area. Though the area under potato in the region, as a percentage of the net-cropped area, is about four times the national level the yield in all NE states except Tripura (18.5 t/ha) is low (4–8 t/ha) as compared to the national average of 18.2 t/ha. The main reasons for the low yield are inadequate availability of healthy seed *vis-à-vis* poor management practices followed and presence of serious diseases like late blight, brown rot/bacterial wilt, etc. in the region. Area, production and productivity of potato in different states of NEH



State wise percentage area of potato in NE region

region are given in figures. Assam, Meghalaya and Tripura contribute to about 81% of total area, but account for 87% of the total production of NE region.



Share of potato productivity of different NE States

Popular potato varieties

Some of the exotic varieties Arran Consul, Royal Kidney, Up-to-date, Great Scot, Red Pimpernel and Magnum Bonum are still being cultivated in the hill regions and DRR and Phulwa to a limited extent in the plains. With the intention of replacing the old varieties which are riddled with plenty of problems, improved varieties like Kufri Khasigaro, Kufri Jyoti, Kufri Megha, Kufri Giriraj, Kufri Kanchan, Kufri Himalini and more recently, Kufri Giridhari were developed by CPRI for the NE states. Kufri Jyoti is very popular and occupies the largest area in this region because of its fast bulking habit, good keeping quality and taste, though now it has lost its resistance to late blight. Kufri Megha is also popular as it has high resistance to late blight, but it is a slow bulker. Kufri Giriraj is gaining popularity because of its high yield and resistance to late blight. Farmers are, however, sceptical about its poor keeping quality and short dormancy.

Recently released variety Kufri Himalini for this region is performing well in demonstrations and on-farm trials.

Popular potato varieties in the NE region

| Variety | Year | Remarks |
|-----------------|------|---|
| Kufri Khasigaro | 1968 | Undesirable tuber shape |
| K. Jyoti | 1968 | Very popular, still maximum area in the region |
| K. Megha | 1989 | Highly resistant to late blight, late in maturity |
| K. Giriraj | 1998 | Resistant to late blight, medium maturing |
| K. Kanchan | 1999 | Red skinned and Resistant to wart disease |
| K. Shailja | 2003 | Resistant to late blight, medium maturity |
| K. Himalini | 2005 | Early bulking, medium maturity, late blight resistant |
| K. Giridhari | 2007 | Highly resistant to late blight, late maturing |

Kufri Jyoti and Kufri Giriraj are popular in Mizoram, Nagaland, Meghalaya and Arunachal Pradesh. In addition red skinned varieties Kufri Kanchan, Beeta and Red Pimpernel are popularly grown in Sikkim. Kufri Badshah and Kufri Kanchan are grown by farmers in Nagaland while Meghalaya farmers cultivate Kufri Megha, Great Scot, Royal Kidney and Lah Shidieng.

Cultivation practices

Farmers in Meghalaya plant potato with *nur* and *bun* method and

believe this method (i.e. soil burning) helps in improving soil fertility status and makes hard forest soil friable, thereby, making potato cultivation easy. The *nur* and *bun* method of planting reduces the incidence of insect pest infestation but causes heavy soil erosion in the hill slopes. In most other states of the North eastern region, planting is done by the pit method in heavy slopes and some row planting in terraces. In the plains of Assam and Tripura, ridge and furrow method of planting is adopted.



Farmer in Sikkim cutting tubers for planting



Planting of tubers

Crop management practices

The potato crop is grown throughout the year in one or the other part of the NE region. The different seasons of crop growth are given in the table beneath:

Pest management

The major pests and disease of potato are late blight, brown

Optimum planting and harvesting time in different parts of NE region

| Altitude | Planting time | Harvesting time | Part of NE region |
|-----------------------------------|------------------------|-----------------|--|
| Plains (up to 500 m) | Sept- Oct | Jan- Feb | Assam, Tripura, Manipur valley, Dimapur district of Nagaland and lower parts of Arunachal Pradesh |
| Mid-hill (up to 1500 m) | Feb- March to end July | End June | Siang district (Basar area) of Arunachal Pradesh, Jowai sub division of Jaintia Hills, some areas in Khasi Hills |
| High hills (up to 2400 m) | March-April | July- August | Parts of Arunachal Pradesh, Upper Shillong, Mawphlang and Mairang area of Meghalaya, Mao and Ukhrul area of Manipur, Blue mountains in Mizoram |
| Very high hills (above 2400 m) | -do- | -do- | Tawang, Upper Subansiri, Siang and Kameng districts of Arunachal Pradesh |



Potato in Assam planted in ridges and furrows



Potato harvesting in the plains of Assam

rot/bacterial wilt, red ant, white grub, cutworm and potato tuber moth. Combinations of systemic and contact fungicides (2 sprays of metalaxyl 8% + mancozeb 64% @ 0.25% and 3 sprays of mancozeb @ 0.2%) in alternation have been found effective in controlling potato late



Late blight, a serious impediment in potato production

blight. Though the above spray schedule is effective in managing the disease, the adoption of this practice is minimal due to non-availability of fungicide and difficult terrain for spraying. Potato tuber moth (PTM), a major problem in on-farm storage, is effectively checked using dried and chopped *Lantana camara* leaves, which is locally and easily available. This practice is adopted by the local farmers of Meghalaya. In most other states on-farm storage is minimal.

Storage, consumption pattern and disposal

Various indigenous methods are followed for *in-situ* and *ex-situ* potato storage. In *in-situ* system, the



Different Potato Storage methods in the NE region

farmers do not harvest the crop and allow the tubers to remain in soil. This method is however, used for short storage of 2-3 months only. This system is followed both in the upland and lowland areas. Several types of *ex-situ* indigenous potato storage structures are used *viz.*, pit, wooden structure, baskets and heap storage. Farmers of NE states are not aware of scientific storage methods for both table and seed potatoes. Several on-farm demonstrations held to train the farmers of the region on proper harvesting, tuber treatment, and storage under diffused light have resulted in some adoption.

There is very little post-harvest processing of potato. It is consumed as a boiled vegetable or along with other vegetables and meat. The farmers prefer selling large size potatoes directly to the retailers in local vegetable market. Some produce is also sold to the fellow farmers. Since small size tubers do not fetch good price, these are sold to the middleman/ traders who send it to neighbouring states where small tubers are preferred both for table as well as for seed purposes. There is a need to popularise processing grade varieties in the region.

Production constraints

The constraints of potato production in NE region have been identified as:

- Inadequate availability of quality seed in affordable price

- Non-adoption of suitable varieties
- Potato cultivation under rainfed condition
- Imbalanced dose of fertilizer, phosphate deficient soil
- Prevalence of disease (Late blight, bacterial wilt and phoma blight etc.) and pests like PTM, white grub, cutworm and red ant)
- Inappropriate plant protection measures
- Lack of proper storage facility under ambient condition

Priority needs for improvement of potato production are:

- Need to produce potato seed locally
- Production of quality seed through tissue culture
- Use of TPS as an alternate source of planting material
- Adoption of late blight resistant varieties
- Integrated Disease Management (IDM) of bacterial wilt and late blight
- Production of processing grade potato
- Multiplication of seed by the State Governments through registered growers should be strengthened
- Popularisation of on-farm scientific storage methods

Role of CPRS, Shillong

Production of seed and planting material:

Disease free planting material of Kufri Giriraj, Kufri Jyoti and Kufri Kanchan is produced through micro-plants, micro tubers/mini tubers and TPS tuberlets under controlled condition in polyhouses. The mini-tubers are multiplied for the production of basic seed/quality planting materials. The disease free quality seed produced through tissue culture is pooled and supplied to

various states in NEH region. Improved production, protection and post harvest technologies have been evolved and evaluated through on-farm trials and demonstrations to suit the local needs. Need based training has been imparted to the farmers, farm women, rural youth and extension personnel on improved cultivation practices in potato. The impact of the improved technologies is being assessed. The yield advantage realised through on-farm demonstration of improved technologies was to the extent of 84 per cent over farmers' practice.

Potato seed system

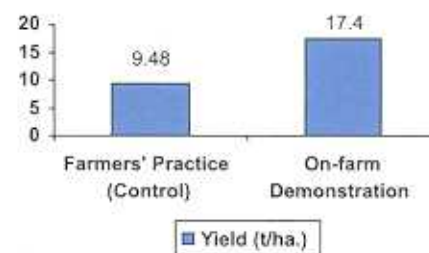
Seed Potato production has been practised in the region through conventional and non-conventional systems or integration of both. The conventional system follows production of nucleus seed, breeder seed, foundation seed and certified seed. In non-conventional system nucleus seed production is achieved through large-scale multiplication of disease free microtubers/micro plants. Production of potato for table as well as for quality seed through TPS is also becoming popular in some of the states like Assam, Tripura and Nagaland. It has been estimated that for an area of 182.23 thousand ha. in North-eastern region, the total requirement of healthy seed (certified) comes to around 455.58 thousand tonnes @ 2.5t/ha. Since, the production of breeder seed is not feasible due to presence of virus vectors and bacterial wilt, it leaves no option but to produce good quality disease free healthy potato seed in the region itself for enhancing productivity of potato in the region. Now emphasis is also being given to identify the areas/locations with low vector and virus pressures in this region to produce breeder/quality seed required for the NE states.



Production of quality planting material through tissue culture



Potato microplants grown in polyhouse

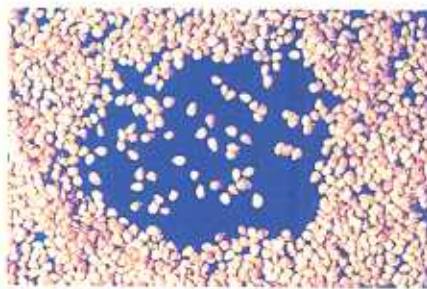


Average yield advantage in on-farm demonstration with K. Giriraj and improved package of practices

True potato seed technology

Besides the regular seed production systems, potato production from true potato seed (TPS) has been possible in most of the potato growing areas of NE region. TPS can be used as a low input alternative for raising commercial crop especially in areas where availability of quality tuber seed at reasonable price is a major

constraint. An eye catching advantage of this method is that the planting of one ha potatoes require only 100-150 g TPS instead of 20-25 tonnes of tubers, which could result in a tremendous saving in cost of production. Added advantages are that the problems and high cost of transport and storage of potato tubers can be avoided by the use of TPS. Following two methods have been found successful for raising commercial potato crop using TPS derived planting materials – i) transplanting seedlings and ii) planting seedling tubers. Transplanting TPS seedlings is successful in areas where the winters are mild, irrigation is available, seedlings get established in shorter time and produce acceptable yields. Second method using seedling tubers as planting material is successful in all



Potato seeds through TPS technology.

areas wherever potato is grown through seed tubers.

Strategies for increasing production and productivity of potato in NE region

The potential strategies for increasing potato productivity in the NE region are:

- Disease resistant high yielding potato varieties in combination with improved crop management, crop protection and storage and post-harvest technologies.

- Availability of critical inputs like seed, fertiliser and plant protection chemicals is to be ensured for greater adoption of improved technologies.
- Farmers of hill region plant potato early and harvest early to avoid late blight infestation and this calls for developing varieties that are early bulking with moderate degree of resistance to late blight so that it caters to the needs of the farmers of the region.
- Dissemination of improved technologies to the farmers is very crucial and information dissemination mechanisms have to be further strengthened.

-S Ramani, R Roy Burman
& VK Gupta

हिन्दी समाचार

अंतर्राष्ट्रीय आलू वर्ष 2008

नवम्बर, 2005 में खाद्य एवं कृषि संगठन (FAO) के 33वें सत्र में पेरू के स्थायी प्रतिनिधि ने एक प्रस्ताव रखा जिसमें दुनिया का ध्यान आलू की तरफ आकर्षित करने को कहा गया ताकि विश्व खाद्य सुरक्षा एवं गरीबी उन्मूलन में इस फसल की क्षमता को पहचाना जा सके। इस प्रस्ताव का लैटिन अमेरिकी एवं कैरीबियन देशों के प्रतिनिधियों ने समर्थन किया। दिसम्बर, 2005 में संयुक्त राष्ट्र संघ की महासभा के 68वें सत्र में इस प्रस्ताव को स्वीकार किया गया तथा वर्ष 2008 को अंतर्राष्ट्रीय आलू वर्ष घोषित किया गया। इस वर्ष को मनाने के लिये

खाद्य एवं कृषि संगठन को विभिन्न सरकारों एवं संगठनों के साथ समन्वय हेतु अधिकृत किया गया। अंतर्राष्ट्रीय आलू वर्ष पूरे विश्व भर में विभिन्न सम्मेलनों, सेमिनार, कार्यशाला आदि के द्वारा मनाया गया ताकि आलू की विश्व खाद्य सुरक्षा प्रदान करने की क्षमता के बारे में लोगों को जागरूक किया जा सके।

इस संदर्भ में खाद्य एवं कृषि संगठन के एशिया एवं प्रशांत क्षेत्रीय कार्यालय ने पेरू तथा थाइलैंड की सरकारों के साथ मिलकर बैंकॉक में 5 मई, 2008 को एक कार्यशाला का आयोजन किया। इस कार्यशाला में बड़ी संख्या में विभिन्न देशों के राजदूत, विश्वविद्यालयों के शिक्षाविद्

तथा उच्च अधिकारियों ने भाग लिया। इस कार्यशाला में आलू से संबंधित उन पहलुओं की पहचान की गई जिन पर विश्व समुदाय को और अधिक ध्यान देने की आवश्यकता है। इसी क्रम में 7-8 अगस्त, 2008 को डण्डी, स्कॉटलैंड में अंतर्राष्ट्रीय आलू उत्पादन वृद्धि पर एक सम्मेलन आयोजित किया गया।

भारत में आलू लगभग 400 वर्ष पहले आया, लेकिन आज यह देश का सबसे प्रमुख गैर-अनाजीय फसल है तथा धान, गेहूँ एवं मक्का के बाद सबसे प्रमुख खाद्य फसल है। ऐसे में अंतर्राष्ट्रीय आलू वर्ष मनाने में भारत भी पीछे नहीं रह सकता था। भारत में इस उत्सव की शुरुआत कोलकाता

में 9-11 जनवरी, 2008 को 'इंडिया इंटरनेशनल पोटेटो एक्सपो-2008' के रूप में हुई। यह एक्सपो इंडियन चैम्बर ऑफ कॉमर्स, पश्चिम बंगाल सरकार तथा भारत सरकार के खाद्य प्रसंस्करण उद्योग मंत्रालय द्वारा संयुक्त रूप से आयोजित किया गया जिसमें केन्द्रीय आलू अनुसंधान संस्थान, शिमला को 'ज्ञान सहयोगी' बनाया गया था। इस एक्सपो में भारत एवं विदेशों के 2500 से अधिक किसान, उद्यमी तथा निर्यातकों ने भाग लिया एवं आपस में सूचनाओं का आदान-प्रदान किया।

इसके अतिरिक्त नई दिल्ली में 9-12 दिसम्बर 2008 के दौरान भारतीय कृषि अनुसंधान परिषद, नई दिल्ली, केन्द्रीय आलू अनुसंधान संस्थान, शिमला व भारतीय आलू संघ, शिमला द्वारा एक वृहद् विश्व आलू सम्मेलन का भी आयोजन किया गया। इस सम्मेलन में लगभग 30 देशों के 550 प्रतिनिधियों ने भाग लिया तथा 50 से अधिक शोध-पत्र पढ़े गए। सम्मेलन के दौरान 60 से अधिक राष्ट्रीय एवं अंतर्राष्ट्रीय संस्थानों ने प्रदर्शनी स्टाल लगाए। सम्मेलन में भारतीय आलू संघ द्वारा आलू के उत्कृष्ट 10 किसानों और 8 उद्यमियों को पुरस्कृत भी किया गया।

हिन्दी चेतना मास

हिन्दी चेतना मास के अवसर पर संस्थान के सभी कर्मचारियों ने मिलकर संकल्प किया कि देश के संविधान में राजभाषा हिन्दी के लिए दिए गए प्रावधानों के प्रति हम मन, कर्म और वचन से निष्ठावान रहेंगे और मूल रूप से अपने सभी कार्यों में सरल हिन्दी का प्रयोग करेंगे। इसी संकल्प के साथ संस्थान के मुख्यालय में 15 सितम्बर, 2008 को हिन्दी दिवस मनाया गया। इस मौके पर हिमाचल प्रदेश सरकार के सूचना एवं जन सम्पर्क विभाग के

उपनिदेशक एवं साहित्यिक पत्रिका 'इरावती' के सम्पादक श्री राजेन्द्र राजन ने बतौर मुख्य अतिथि उपस्थित होकर अपने विचार व्यक्त किए।

एक माह तक चलने वाले इस कार्यक्रम में विभिन्न प्रतियोगिताओं का आयोजन किया गया। कर्मचारियों में हिन्दी के प्रति अभिरुचि पैदा करने तथा कर्मचारियों को प्रोत्साहित करने के उद्देश्य से अलग-अलग प्रतियोगिताओं में पहला, दूसरा व तीसरा स्थान पाने वाले प्रतिभागियों को सम्मानित किया गया। पुरस्कार वितरण कार्यक्रम हिमाचल प्रदेश विश्वविद्यालय के सांध्य महाविद्यालय के पूर्व प्राचार्य एवं जाने-माने साहित्यकार प्रो. अनिल राकेशी के कर-कमलों द्वारा सम्पन्न हुआ। उनका कहना था कि हमारी राष्ट्रीय पहचान हमारी भाषा और वेशभूषा है अतः हमें अपनी भाषा और संस्कृति को संजोकर रखना चाहिए।



मुख्य अतिथि का स्वागत

इस अवसर पर बोलते हुए संस्थान के निदेशक डा. सुमन कुमार पाण्डेय ने हिन्दी पुस्तकों के महत्व पर बल दिया। उनका मानना था कि हिन्दी साहित्य और सामाजिक पुस्तकों के माध्यम से ही हमें हिन्दी पढ़ने और पढ़ाने की प्रेरणा मिलती है। उन्होंने नकद प्रोत्साहन योजना के अन्तर्गत साल भर हिन्दी में काम करने वाले कर्मचारियों को नकद पुरस्कार देकर सम्मानित किया। संस्थान के सहायक निदेशक (राजभाषा) ने कर्मचारियों को भारत सरकार की राजभाषा नीति से संबंधित जानकारी

देते हुए हिन्दी का मूल पत्राचार बढ़ाने पर बल दिया।



मुख्य अतिथि द्वारा पुरस्कार वितरण

नकद प्रोत्साहन योजना

राजभाषा विभाग, गृह मंत्रालय, भारत सरकार की प्रोत्साहन योजना के अन्तर्गत सरकारी काम काज मूल रूप से हिन्दी में करने वाले कर्मचारियों को वार्षिक हिन्दी समारोह के अवसर पर निदेशक महोदय ने नकद पुरस्कार देकर सम्मानित किया गया। इस क्रम में श्रीमती मीना वर्मा और श्री दलजीत सिंह को प्रथम तथा श्री जगदीश चन्द को द्वितीय और श्री दीपराज, श्रीमती संध्या कपिला और श्री नरेन्द्र कुमार को तृतीय पुरस्कार के रूप में नकद राशि प्रदान की गई।



निदेशक महोदय द्वारा नकद पुरस्कार वितरण

प्रश्न मंच में पहला स्थान

नगर राजभाषा कार्यान्वयन समिति, शिमला के तत्वाधान में आयोजित प्रश्नमंच प्रतियोगिता में इस संस्थान के डा. अरुण पंडित एवं श्री हीरा नन्द शर्मा ने पहला स्थान हासिल कर संस्थान का नाम रोशन किया। उल्लेखनीय है कि इन प्रतियोगिताओं में शिमला स्थित

केन्द्रीय सरकार के कार्यालयों उपक्रमों निगमों, बैंकों आदि की प्रतिभागिता रहती है। उन्हें यह पुरस्कार वर्ष 2009 में आयोजित होने वाले नराकास के हिन्दी समारोह के अवसर पर प्रदान किया जाएगा।

मोदीपुरम में हिन्दी पखवाड़ा

गत् वर्षों की भान्ति इस वर्ष भी संस्थान के मोदीपुरम परिसर में हिन्दी पखवाड़ा की धूम रही। संस्थान के संयुक्त निदेशक डा. वीर पाल सिंह ने आयोजन का शुभारंभ करते हुए प्रत्येक कर्मचारी से राजभाषा के प्रचार-प्रसार में अपना योगदान देने पर बल दिया। चन्द्रह दिनों तक चलने वाले इस आयोजन में कम्प्यूटर पर हिन्दी टाइपिंग, निबंध, सामान्य ज्ञान, नोटिंग एवं ड्राफ्टिंग जैसी कई प्रतियोगिताएं रखी गईं। पारितोषिक वितरण कार्यक्रम के अवसर पर कविता पाठ का आयोजन किया गया। इस अवसर पर हिन्दी के कवि श्री मनोज कुमार को विशेष रूप से आमंत्रित किया गया। हर वर्ग के कर्मचारियों की कविताओं ने समारोह को कवितामय बना दिया। इस मौके पर विभिन्न प्रतियोगिताओं के विजेताओं को पुरस्कार देकर सम्मानित किया गया।

केन्द्रीय आलू अनुसंधान केन्द्र, उटी में हिन्दी चेतना मास

सितम्बर 2008 के दौरान केन्द्रीय आलू अनुसंधान केन्द्र, उटी में हिन्दी चेतना मास मनाया गया जिसमें केन्द्र तथा उटी राजभाषा कार्यान्वयन समिति के कर्मचारियों के बीच विभिन्न प्रकार की प्रतियोगिताओं का आयोजन किया गया। हिन्दी मास मनाने के लिए केन्द्र को जिला राजभाषा कार्यान्वयन समिति द्वारा द्वितीय पुरस्कार भी प्रदान किया गया।



मुख्य अतिथि द्वारा पुरस्कार वितरण

केन्द्रीय आलू अनुसंधान केन्द्र, शिलांग में हिन्दी दिवस समारोह

दिनांक 24 सितम्बर, 2008 को केन्द्रीय आलू अनुसंधान केन्द्र, शिलांग के परिसर में हिन्दी दिवस समारोह का आयोजन किया गया। इस आयोजन में डॉ. एस. के. शर्मा, विभागाध्यक्ष, हिन्दी विभाग, उत्तर पूर्वी पर्वतीय विश्वविद्यालय, मुख्य अतिथि के रूप में उपस्थित थे। कार्यक्रम का शुभारम्भ मुख्य अतिथि के सम्मान से किया गया। तत्पश्चात डॉ. एस. रमणी, अध्यक्ष, केन्द्रीय आलू अनुसंधान केन्द्र, शिलांग ने सभा को सम्बोधित किया। उन्होंने अपने सम्बोधन में मुख्य अतिथि को केन्द्र में होने वाले कार्यों तथा हिन्दी के विकास हेतु उठाए जाने वाले कदमों से अवगत कराया। हिन्दी दिवस के उपलक्ष्य में आलू के विषय पर नारा लेखन प्रतियोगिता का आयोजन किया गया जिसमें केन्द्र के कर्मचारियों ने उत्साहपूर्वक भाग लिया। इस प्रतियोगिता में विपुल कुमार दास, संचिता राय तथा राम इकबाल राय ने क्रमशः प्रथम, द्वितीय तथा सांत्वना पुरस्कार प्राप्त किया। मुख्य अतिथि, डॉ. एस. के. शर्मा ने प्रतियोगिता के विजेताओं को पुरस्कार वितरित किया। मुख्य अतिथि ने अपने संबोधन में राजभाषा हिन्दी तथा हिन्दी दिवस के महत्व पर प्रकाश डाला। उन्होंने केन्द्र में हिन्दी के विकास हेतु किये जाने वाले प्रयासों की सराहना की।



शिलांग के केन्द्राध्यक्ष का सम्बोधन

केन्द्रीय आलू अनुसंधान केन्द्र, उटी में किसान मेला

अंतर्राष्ट्रीय आलू वर्ष 2008 के उपलक्ष्य में केन्द्रीय आलू अनुसंधान केन्द्र, उटी द्वारा संस्थान की आलू उत्पादन तकनीकों को किसानों के बीच लोकप्रिय बनाने हेतु दिनांक 1 जुलाई, 2008 को एक किसान मेले का आयोजन किया गया। इस मेले में लगभग 80 किसानों ने भाग लिया जिन्हें संस्थान द्वारा विकसित आलू की किस्मों, बीज उत्पादन तकनीक, पिछेता झुलसा रोग प्रबंधन तथा विभिन्न अंतः फसल प्रणालियों के बारे में जानकारी दी गई। किसानों को नव-विकसित किस्में 'कुफरी हिमालिनी' तथा 'कुफरी गिरधारी' के बारे में विशेष रूप से जानकारी दी गई।



उटी के किसान मेले में आये

केन्द्रीय आलू अनुसंधान केन्द्र, ग्वालियर में वन महोत्सव

दिनांक 28 अगस्त, 2008 को केन्द्राध्यक्ष डॉ. वीर सिंह कुशवाह की अध्यक्षता में 'वन महोत्सव' कार्यक्रम मनाया गया जिसमें आंवला के 500

2006-07
2007-08
2008-09

पौधों का केन्द्र में रोपण किया गया। इस कार्यक्रम के मुख्य अतिथि राजमाता विजयराजे सिंधिया कृषि विश्वविद्यालय के नवनियुक्त कुलपति माननीय डॉ. विजय सिंह तोमर थे। डॉ. कुशवाह ने अपने उद्बोधन भाषण में कहा कि ग्वालियर में कृषि विश्वविद्यालय की स्थापना होने पर आलू केंद्र व कृषि विश्वविद्यालय के बीच विशेष संपर्क कायम होगा और आने वाले समय में क्षेत्र के किसानों को इसका लाभ मिलेगा।



वन महोत्सव के दौरान डा. तोमर द्वारा वृक्षारोपण

मुख्य अतिथि महोदय ने सभा को संबोधित करते हुए कहा कि हमें किसानों के फसल उत्पादन में अधिक से अधिक वृद्धि करने के लिए नये-नये अनुसंधान कार्य करने होंगे। आलू अनुसंधान केंद्र का अनुसंधान कार्यों एवं प्रजनक बीज उत्पादन के कारण विशेष स्थान है क्योंकि यह केंद्र अनुसंधान

तथा आलू का प्रजनक बीज बनाकर सरकारी संस्थाओं व किसानों को अपना बहुमूल्य योगदान दे रहा है। उन्होंने यह भी कहा कि इस संबंध में कृषि विश्वविद्यालय द्वारा भारतीय कृषि अनुसंधान परिषद् के अन्य अनुसंधान केंद्रों के साथ मिलकर कार्य करने के प्रयास किए जायेंगे। अंत में डॉ. अशोक कुमार सोमानी, प्रधान वैज्ञानिक ने मुख्य अतिथि का आभार व्यक्त करते हुए कहा कि केंद्र व विश्वविद्यालय के सहयोग से दोनों लाभान्वित होंगे।

आकर्षण का केन्द्र है संस्थान का सभागार

आजकल केन्द्रीय आलू अनुसंधान संस्थान का सभागार रंगमंचीय और अन्य सांस्कृतिक गतिविधियों का केन्द्र बन गया है। हो भी क्यों न! इस नवीकृत सभागार में प्रवेश करते ही आलू की विभिन्न किस्मों और संस्थान की उपलब्धियों से संबंधित बोर्ड व चार्ट अनायास ही अपनी ओर आकर्षित कर लेते हैं। फिर हरे रंग की आरामदायक पुशबैक कुर्सियां, हरा पर्दा और खूबसूरत मंचीय सुविधाओं व प्रकाश व्यवस्था से लैस हाल में बैठकर नाटक देखने का अपना ही आनन्द है।

इसी आकर्षण के चलते इस सभागार में ययावर रंगमण्डल, लखनऊ के कलाकारों ने सितम्बर माह में अण्डर



नाट्य मंचन का एक दृश्य

‘संकेटरी उर्फ किराए का पति’ और ‘संचूरी बुड़डा’ का मंचन किया। हास्य व्यंग्य से भरपूर इन हाउस फुल प्रस्तुतियों में ‘पंख होते तो’ और विश्व प्रख्यात रंगकर्मी सुश्री नादिरा बब्बर के निर्देशन में एम. एफ. हुसैन की जीवनी पर आधारित नाटक ‘पेंसिल से ब्रश तक’ का मंचन किया गया। इसी कड़ी में प्रसिद्ध हास्य कवि श्री सुरेन्द्र शर्मा की गुदगुदाने वाली कविताओं ने इस प्रेक्षागृह हास्यमय बना दिया। आज संस्थान का यह सभागार शिमला की रंगमंचीय और सांस्कृतिक गतिविधियों का केन्द्र बन गया है।

Printed:

Dec 2008 (500 copies)

Editorial Committee : Brajesh Singh, Anil Kumar, Avnish Atrey
Secretarial Assistance: Shashi Bala Thakur

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:

Malhotra Publishing House, B-6, DSIDC Complex, Kirti Nagar, New Delhi. E-mail: mph@vsnl.com