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Highlights

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Regional Initiatives on Improvement of Vegetables and Adaptive Trials in SAARC countries

New dimension of SAC

SAARC Agriculture Centre (SAC) organized a Consultative Workshop on **"Regional Initiatives on Improvement of Vegetables and Adaptive Trials in SAARC Countries (SVATNet)"** during 16-17 November 2011 at SAC, Dhaka, Bangladesh. The concept of this program on "SAARC Vegetables Adaptability Testing" was initiated by the Technical Committee for Agriculture and Rural Development (TCARD) and discussed at the Regional workshop held during 8-9 October, 2010 on "Improvement of Vegetables and Adaptive Trials in SAARC Countries" in Dhaka, Bangladesh with the participation of the national partners/focal point scientists who had shown their willingness to share improved cultivars of five vegetables viz., tomato, okra, brinjal, cucumber and pumpkin.

The vegetables were chosen on the basis of their need and preference, for adaptive trials in the interested SAARC member countries. These five vegetables were chosen especially targeting small/ marginal farmers of the region. It was agreed to include more vegetable crops in the future depending on the initial progress upon mutual consultation under the initiatives as:

a) Elite varieties and germplasm as identified would be shared in a network approach;

b) Best practices available would be identified;

c) Overall knowledge base within the countries would be shared; and

d) Internship training would also be pursued

The initiatives would initially be for a period of three (3) years and depending on the progress and further interest of member countries, these may be further expanded and carried forward.

Modalities and practical aspects of the proposed network was discussed in the consultative workshop organized by SAC as one of its

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approved program for 2011. Participants representing six regional SAARC countries namely Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka attended and following recommendations were adopted unanimously.

Recommendations

At the end of the two day consultative workshop, following recommendations were made by the delegation representing SAARC member countries

1. General Recommendations:

- Coordination structure of the proposed network is accepted
- SAC is accepted as coordinating organization
- Coordination at three levels viz, Regional, National and Local.

Regional level: National Focal Person (NFP)

Director /country nominee of National Horticulture/ Vegetables/Research Center/Institutes are selected as NFP for the adaptive trials from SAARC member countries as indicated below:-

Director, Horticulture Research Center, Bangladesh Agricultural Research Institute (BARI); Director, Department of Agriculture, Ministry of Agriculture and Forests, Bhutan; Deputy Director General (Horticulture), ICAR, New Delhi, India; Director (Crops & Hort.), Nepal; Director, Horticulture Research Institute, NARC, Pakistan; Director, Horticultural Crops Research and Development Institute (HORDI), Sri Lanka and one nominee from AVRDC

National Level: Research Team Leader (RTL)

Chief Scientific Officer, Vegetable Division, HRC, BARI, Bangladesh; Program Officer, Horticulture Sector, RDC, Yusipang, Bhutan; National Research Team Leader, Director, Indian Institute of Vegetable Research, Varanasi, India; Chief, Horticulture Research Division, Nepal; Coordinator Vegetable, Horticulture Research Institute, Pakistan; Research Officer, HORDI, Gannoruwa, Sri Lanka

- NFP will facilitate the implementation and RTL will be responsible for execution of the program and submission of the reports to SAC
- Agreed to have 5 crops initially namely brinjal, cucumber, okra, pumpkin, tomato and depending on the future needs the program can be extended to include other vegetable crops.
- It was agreed to share only open pollinated/pure line elite varieties and not to share F_1 hybrids at the initial stages of the program.
- BARI will provide cold storage facilities to SAC for seed storage.

2. Recommendations on Adaptability Trials

- Each participating countries will conduct trials in main cropping season
- There should be three (3) locations /country and 3 Replications per trial and RCBD will be used as the experimental design. The best local check variety should be used.
- It was decided to have following population for each crop

  Tomato/Okra: 20 plants/replication/entry
  Pumpkin /Cucumber: 6-10 plants/replication/entry
  Brinjal: 10 plants /replication/entry
- Cultural practices will be followed according to the national recommendations for respective crops. Participating countries will send their seed

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Enhancing Oilseed Production through Improved Technology in SAARC countries

A Regional Workshop on **'Enhancing Oilseed Production through Improved Technology in SAARC Countries'** was organized with the objectives to share ideas/experiences and to formulate a regional plan of action and strategies for enhancing oilseeds production in South Asian countries by SAARC Agricultural Centre (SAC) in association with Directorate of Oilseeds Research (DOR), Indian Council of Agricultural Research (ICAR) during 20-21 December, 2011 in Hyderabad, India.

Non-conventional crops in non-traditional areas: Enhance the oilseed production

The Inaugural Session was chaired by Dr. Abul Kalam Azad, Director, SAC, Dhaka, Bangladesh; Chief Guest and Key note speaker Padmasree Dr. M.V. Rao, Former Director General, ICAR and Former Vice-Chancellor, ANGRAU, Hyderabad; Dr. Md. Rawshan Ali, Chief Scientific Officer (CSO), Bangladesh Agricultural Research Institute (BARI); Mr. Tshering Wangchen, Research Officer, RDC, Bhutan; Dr. Tara Bahadur Ghimire, Sr. Scientist, Nepal Agricultural Research Council (NARC); Dr. Akbar Shah Mohmand, Sr. Director, Crop Science Institute, National Agricultural Research Centre (NARC); Ms. Diddugodage Chamila Jeewani, Research Officer, Sri Lanka; Dr. Md. Nurul Alam, SPS(PSPD), SAC; Ms. Nasrin Akter, Sr. Programme Officer, SAC, Dhaka; Dr. S.K. Srivastava, Director, Directorate of Soybean Research, Indore; Dr. J.S. Chauhan, Director, Directorate of Rapeseed Mustard Research, Bharatpur; Dr. J.B. Mishra, Director, Directorate of Groundnut Research, Junagadh; Dr. Arulraj, Director, Directorate of Oil Palm Research, Pedavegi; Dr. R.L. Srivastava, Project Coordinator (Linseed), CSAUA&T, Kanpur; Dr. A.R.G. Ranganatha, Project Coordinator (Sesame & Niger), JNKVV, Jabalpur; Dr. V. Ranga Rao, Former Project Director, DOR, Hyderabad; Dr. D.M. Hegde, Ex. Project Director, DOR, Hyderabad and Directors and Incharges of local ICAR institutes (DRR, CRIDA, NBPGR) and senior officials of ANGRAU; Dr. Anisetty N. Murthy, Retd. FAO Expert, Hyderabad, India graced the inaugural session of this workshop.

Dr. K.S. Varaprasad, Project Director, DOR, Hyderabad welcomed all guests, specialists and other dignitaries present in the inaugural session. In welcome address, he gave brief information about oilseed scenario in India and highlighted the commonness among SAARC countries in enhancing oilseeds production. He gave details about the schedule of various technical sessions for the two day workshop. He also thanked SAC for choosing the DOR, Hyderabad as venue for conducting this regional workshop.

Dr. Md. Nurul Alam, Senior Program Specialist, SAC gave a brief introduction of SAC establishment and various activities of the Centre.

Padmasree Dr. M.V. Rao in his key note address on **'Current Status and Future Prospects of Oilseeds Production in SAARC Countries'** emphasized that oilseed crops are common in SAARC countries and there is a tremendous opportunities to share the germplasm and advanced production technologies. All the SAARC countries are importers of oil to meet the domestic

demands of growing population in their respective countries. India is unique in cultivating all the traditional and non-traditional oilseed crops. He stressed that exchange of information, knowledge and materials is the need of the hour. Technologies developed across the SAARC countries can be shared for enhancing the oilseed production in a much more cooperative way. He also explained the importance of Technology Mission on Oilseeds in India and the benefits reaped through yellow revolution. He suggested that non conventional crops in non-traditional areas could be an excellent strategy to enhance the oilseed production. Dr. Rao informed that palm oil with its highest oil yield capacity has great scope in improving the oil production and sharing strategies, wherever there is oil palm cultivation possibility. Some of the non-conventional oils like rice bran, cotton seed and coconut are having a lot of scope in adding to the oil basket of India. He emphasized for strong cooperation among SAARC countries for enhancing oilseeds production. Dr. Rao strongly emphasized the need for exchange of germplasm/seed material as a key area to be addressed. He also stressed that IPR, WTO, and PPV&FRA issues among SAARC countries have to overcome for the sharing of germplasm and seed materials.

Dr Abul Kalam Azad, Director, SAC as the chairman of inaugural session informed that policy planning is needed to improve oilseed production in SAARC countries and explained the activities at the Centre. The regional study is therefore undertaken for providing policy input. The regional knowledge would also help translating research programme of SAARC countries. He also said that technocrats should come up with innovative technologies to produce more food for solving nutrition and food security which is the goal of SAARC & SAC. Dr. Azad informed that a seed bank agreement was signed in the last SAARC summit and a SAARC Seed Forum (SSF) & Material Transfer Agreement (MTA) is also developed recently to make available the seed for R & D. Dr. Azad was hopeful that recommendations emanating from this workshop will be discussed at respective government's level. Dr Harvir Singh, Principal Scientist and Head, Crop Protection gave vote of thanks.

The regional workshop was partitioned into four technical sessions. Total fourteen papers were presented in all the technical sessions including a keynote paper on the first day. Country status reports from India by Dr. K.S. Varaprasad, Project Director, DOR; Bangladesh by Dr. Md. Rawshan Ali, CSO, BARI; Bhutan by Mr. Tshering Wangchen, Research Officer, RDC; Nepal by Dr. Tara Bahadur Ghimire, Sr. Scientist, NARC; Pakistan by Dr. Akbar Shah Mohmand, Sr. Director, CSINARC and Sri Lanka by Ms. Diddugodage Chamila Jeewani, Research Officer were presented in the technical session.

The special papers from India on Groundnut by Dr. J.B. Mishra, Director, DGR, Junagadh; Rapeseed-Mustard by Dr. J.S. Chauhan, Director, DRMR, Bharatpur; Soybean by Dr. S.K. Srivastava, Director, DSR, Indore; Sunflower, Safflower and Castor by Dr. K.S. Varaprasad, Project Director, DOR, Hyderabad and Oilpalm by Dr. Arulraj, Director, DOPR, Pedavegi were presented in the technical session.

On the second day, all resource speakers from SAARC countries and all participants from India and SAC discussed on the four thematic areas: a) **Research issues**; b) **Extension and development issues** c) **Policies**; d) **Future prospects**. After a whole day brain storming sessions, the participants came up with a number of excellent recommendations developed by all resource speakers from SAARC member countries and participants. Dr. M. Datta, Head (GED), NBPGR, New Delhi; Dr. K. Manoharan, Director, DOR, Hyderabad and Ms. Nasrin Akter, Sr. Programme Officer (Crops), SAC facilitated the thematic group work in the brainstorming sessions. Ms. Nasrin also coordinated the program from SAC.

The concluding session started with a welcome address by Dr. KS Varaprasad, Project Director, Dr. EA Siddique, former DDG (Crop Sciences), ICAR. In his introductory speech he remarked that there are many things common in agriculture in all SAARC countries. While much could be done for improvement of grain crops, the same in oilseeds was not realized as they are grown under rainfed conditions which have led to high import of edible oils in all SAARC countries.

He remarked that increased productivity which is the research priority in oilseeds could be achieved through two ways viz., recombination breeding utilizing the variability available and the heterosis breeding exploiting hybrid vigour. While rich germplasm available in all crops should be used properly, many a time the required variability could be created if not available or the hidden variability may be looked into. The other possibility is to explore the introduction of exotic germplasm through MTA. The successful development and use of synthetic polyploids in wheat and *Brassicas* could be emulated in

groundnut to generate new variability since being a teraploid. Dr Siddique suggested the use of conventional breeding and genetic engineering to tackle abiotic stresses especially drought. The quality issues also to be addressed in a focused way as oilseeds are mostly used for domestic edible puposes. It is right time to expedite the research efforts on hybrid technology in crops like *Brassicas* and *sesame*. He also expressed his concern over the yield gaps which are enormous in rainfed crops and suggested for farmers' training on integrated crop management. The low seed replacement rate is another issue in oilseeds which can be tackled through practicing seed village concepts and establishment of seed banks. He also stressed the need for market intervention, crop insurance for rainfed crops and value addition in oilseeds. Dr. Siddique suggested to SAARC to establish regional institutes for a few oilseed crops like that of CGIAR system. To be comfortable with the edible oil situation at SAARC countries in future, it is recommended to put into use only non-edible oils for biodiesel purposes.

Dr. M. Sujatha, Principal Scientist & Head, Crop Improvement section, DOR presented the recommendations emerged from different sessions which were crops and country-specific.

The major recommendations of this Oilseeds workshop are:

Actionable points

Immediate applicability

- Organizing training programmes on 'Technologies for increasing oilseeds productivity and production' for the benefit of SAARC member countries.
- Exchange of scientific and technical expertise among the SAARC member countries for consultancy, research and education
- Designation of *Brassica* germplasm as per the ITPGRFA by the SAARC member countries
- Exchange of advanced breeding materials and crop production technologies for local testing and adoption
- Enhance exchange of germplasm among SAARC countries.
- Training and capacity building of farmers for increasing productivity of oilseeds.
- Explore new sources of vegetable oil from both traditional and non-traditional sources such as oilseed groundnut, oilseed soybean, rice bran, cotton seed, corn oil, tree borne oilseeds, etc.

Medium term applicability

- Establish Regional Institute for Oilseeds Research and Development in SAARC
- SAC may organize pooling and multi-location (country) testing and monitoring of promising varieties/hybrids similar to coordinated trials.
- Explore sources of additional funding with UNIDO and ASEAN.
- Organize joint explorations for focused collections in SAARC region.
- Institutional linkage mechanisms and private participation for accelerated technology development and transfer with backing up support system.

Researchable Issues

Groundnut

- Development of short duration varieties suitable for different cropping systems including paddy fallows,
- Development of varieties tolerant to biotic (stem rot, collar rot, PBND) and abiotic stresses (drought, terminal stress, salinity, water logging etc.),
- Revision of fertilizer recommendation based on soil test and target yield and supply of balanced nutrition (include secondary and micronutrients) through customized fertilizers along with seed protection through seed dressings,
- Identification of efficient strains of bio-inoculants
- Addressing problems of seed viability and dormancy and aflatoxin contamination
- Identification and utilization of high physiological productive lines like high pre-flowering leaf area index (LAI) types for realizing faster canopy coverage resulting in enhanced productivity levels.
- Strategies to step up seed multiplication and distribution for adoption of improved varieties.

Rapeseed-mustard

- Development of hybrids for high input management and irrigated conditions with high yield potential and tolerance to Alternaria.
- Development of high yielding varieties for low input management and rainfed conditions.
- Development of temperature tolerance varieties during juvenile stage and terminal stresses with early maturity
- Development of canola type varieties
- Development of agro-techniques for cultivation of mustard under different cropping systems, paddy fallows or major rice based cropping systems

- Surveillance of pests that have common geographic-agro-ecologic sharing like mustard aphid for better monitoring and forewarning.

Sesame

- Exploitation of heterosis to develop hybrids for high input management under irrigated summer cultivation through establishment of lead research centres in SAARC
- Development of photo and thermo insensitive varieties and synchronous maturity
- Development of varieties tolerant to phyllody, water logging, drought, stem and root rot tolerance.

Sunflower

- Development of short duration hybrids for spring season cropping systems
- Development of genotypes for tolerance to drought, terminal stress, high temperature and water logging
- Overcoming seed setting problem
- Development of hybrids resistance to Alternaria, SND and powdery mildew
- Short duration, dwarf varieties/hybrids for lodging tolerance

Safflower

- Identify, validate and sharing of CMS systems and development of viable seed production systems.
- Development of varieties/hybrids with high oil content
- Development of varieties/hybrids tolerant to aphids, Alternaria and wilt
- Development of agro-techniques for cultivation of safflower under paddy fallows and intercropping systems
- Development of high yielding non-spiny varieties and hybrids for dual purpose of oil and petals.

Soybean

- Development of varieties with photo and thermo insensitivity, terminal stress tolerance and higher seed viability
- Development of short duration varieties for double and inter cropping under rainfed conditions.
- Development of varieties tolerant to biotic stresses specially rust
- Basic research on increasing oil content vs. protein relationships linked with profitability of this dual purpose crop.

Oil Palm

- Development of dwarf varieties/hybrids for high yield and drought tolerance
- Development of early selection markers for reducing breeding time/frequency
- Development of efficient tools and equipment for harvesting

Extension and Development Issues

- Wherever transferable and adaptable technologies are available, transfer of technology has to be stepped up with back up quality input supply and credit
- Wherever the technology gap is not pronounced, research need has to be stepped up
- In on-farm adaptive trials demonstrate potentials of oilseeds, including oil palm
- Use available effective mass communication mechanisms for accelerated transfer of technology
- Undertake farmers' trainings for skill development and village adoption mechanism for effective and accelerated transfer of technology
- Organize seed village programme for production of varieties and hybrid seeds to ensure quicker spread and increased seed replacement ratio.

Policy Issues

- Exchange of germplasm/varieties among member countries without barriers. Free flow of finished product (improved varieties and hybrids) for micro/local testing through adaptive research
- Proper accountability mechanisms through STMA (Standard Material Transfer Agreement) should be followed
- Ensure remunerative pricing for oilseeds backed with marketing support
- Encourage pricing of oilseeds based on oil content and quality
- Decontrol of traditional oilseeds (from small scale sector) for efficient processing and higher oil recovery
- Development and availability of small farm machinery/implements for oilseeds production, operations and small scale processing
- Development of customized fertilizers specific to each oilseed crop.
- Development of simple soil testing kits for quick and low cost assessment of soil fertility

- Development of infrastructure and logistic support for community seed storage, safe storage and transportation of biological materials and their positioning
- Timely availability of credit
- Effective and strong seed chain (breeder-foundation-certified-truthfully labeled) with due accountability and timely availability of seeds with back up quality control
- Ensure risk minimization for crop failures through workable/reliable crop insurance mechanisms
- Establish strong public private partnerships with backward (farmer) and forward (industry) linkages. Encourage private sector participation for collaborative research and development
- Enhance the capacity building of scientific and technical personnel in the region with available expertise within SAARC and beyond as per need
- Institutional linkage mechanisms through Krishi Vigyan Kendras (KVKs), Department of Agriculture, District Agricultural Technology Transfer (DATT) Centre, Agricultural Technology Management Association (ATMA) etc. for accelerated technology transfer and adoption with back up support system.

Future Prospects

- Expansion of oilseeds through non-traditional areas, seasons, cropping systems, paddy fallows etc.
- Explore non-traditional oilseeds such as sunflower, oil palm, oilseed soybean, oilseed groundnut, cotton seed oil, rice bran oil, maize corn oil and tree borne oilseeds etc.
- Adopt efficient soil and moisture conservation measures based on water shed development
- SAARC may organize procurement of promising seed material of oilseed crops from potential sources/countries and organize/distribute their evaluation under adaptive trials within member countries
- Additional funding support for SAARC may be explored with UNIDO and ASEAN
- Diversion of edible vegetable oils for biofuel purposes should be strictly discouraged to ensure higher per capita edible availability
- Regional Centers or Institutes may be established in relevant countries to coordinate research, development and policy issues among SAARC countries.

Improvement of Vegetables and Adaptive Trials

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materials of varieties agreed to SAC by Mid January. Seeds samples should accompany with germination reports. SAC is authorized to code/decode the varieties.

- All the seeds required for the trials will be provided during first three years.
- Quantities of seed provided by each country will be as follows

  Brinjal: 1500 seed/variety
  Cucumber: 1500 seeds/variety
  Okra: 2500 seeds/variety
  Pumpkin: 1500 seeds/variety
  Tomato: 2500 seeds/variety
- SAC will provide observations to be made, standard data sheets and other recording material in consultation with AVRDC. These data sheets will be circulated to participating countries for finalization.
- NFP/RTL are jointly responsible for sending duly filled in data forms to SAC
- RTL should communicate with SAC at least two times (One month after planting/after harvesting) regarding the progress of the trials

3. Recommendations on funding and other matters

- All trials will be run initially by the respective National Agriculture Research System (NARS) of the participating countries.
- Annual forum will be funded by SAC.
- One nominee from each SAARC country may be invited for the participation at the training program at RCSEA in Thailand. AVRDC needs to be requested in this regard.
- AVRDC and SAC will develop project proposal for future funding
- Issues related to Materials Transfer Agreement (MTA) will be coordinated and facilitated by SAC.
- Annual forum will be held once a year in every country by rotation. NFP and the RTL will attend the forum which will be held in mid November of each year.

Public support in the production and marketing system in agriculture of SAARC countries

Subsidized irrigation, fertilizers, mechanization and credit on low interest rates to encourage farmers

A two-day consultation workshop on **"Public Support in the Production and Marketing System in Agriculture of SAARC Countries"** was held in Kathmandu, Nepal from 14-15 December 2011 as a part of the regional study. The Workshop was jointly organized by the SAARC Agriculture Centre (SAC) and the Department of Agriculture (DOA), Nepal. Mr. Nandan Kumar Dutta, Honorable Minister of Agriculture and Co-operatives (MOAC), Nepal graced the occasion as Chief Guest and Mr. Nathu Prashad Chaudhary, Secretary, MOAC, Nepal presided over the inaugural session.. Dr. Shyam Kishor Shah, Director General, DOA, Nepal presented the keynote address. Mr. Tareque Muhammad, Director (ARD), SAARC Secretariat, Nepal and Mr. Ram Prasad Pulami, Honorable Governing Board Member of SAC from Nepal were Special guests and the Guest of Honour respectively. Dr. H. Hemal Fonseka, Senior Program Specialist (Crops), SAC offered the welcome speech and introduced SAC. Mr. Mohammad Abdullah, Senior Program Officer (Publications), SAC briefly informed the meeting regarding the goal and objectives of the Workshop.

During the technical session, country papers were presented by Mr. Choni Dendup from Bhutan, Dr. P. Shinoj from India, Dr. B.D. Awasthi from Nepal and Dr. Ahmed Shareef Nafees from the Maldives in the first day of the workshop. There were other three local scientific papers presented by the Program Directors (Vegetables, Ag Extension and Agri-Business Directorate) of DOA, Nepal. Dr. Muhammad Sharif, from Pakistan presided over the technical session as Chairman.

During the second day of the workshop, country paper from Bangladesh and Pakistan were presented by Dr. S.M. Fakhrul Islam and Dr. Muhammad Sharif respectively. Dr. Abul Kalam Azad, Director, SAC presided over the session as Chairman.

There was a brain-storming session arranged after the completion of presenting all country papers. The respective resource person from the SAARC member countries was the team leader for each group. The group leaders of the brain-storming session presented their recommendations from their respective groups and the floor was open for discussion. Dr. B.D. Awasthi, Local Coordinator from Nepal offered all recommendations in a cumulative presentation. The team leader of the groups of the session suggested broadcasting of agricultural technology through establishing satellite TV channel for rural development in SAARC Region. The meeting also suggested supporting the farmers with subsidized irrigation, fertilizer, mechanization and credit on very low interest rates to encourage the farmers for better feeding their nations. During the concluding session, certificates and crests were distributed by Mr. Nathu Prashad Chaudhary, Secretary, MoAC, Nepal to the participants and the distinguished guests.

Evolution of versatile, high yielding, early maturing and disease resistant germplasm of mungbean

Mungbean (*Vigna radiata (L.)* Wilczek) is an important kharif pulse crop grown in Punjab, Pakistan. It constitutes a significant amount of protein (24%) and consumed as dhal, boiled dry beans and also used in many bakery products. It may also be used as fodder for livestock or incorporated in the soil for enriching soil organic matter. Moreover, it helps fixing atmospheric nitrogen in the soil through symbiosis.

The major problems of poor yield (563 Kg ha^{-1}) in mungbean are indeterminate plant growth habit, lack of synchronous maturity and susceptible to various diseases like mungbean yellow mosaic virus, cercospora leaf spot and urdbean leaf crinkle virus. A variety resistant to a prevailing race of pathogen may become susceptible with the passage of time because of development of a new race. Thus continuous efforts for the development of disease resistant genotypes are essentially required to increase and sustain mungbean production in the country. Keeping in view all these problems, the improvement work on mungbean is in progress at Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad to evolve high yielding, early maturing along with determinate plant growth habit and disease resistance germplasm. So for the mungbean improvement programme at NIAB, Faisalabad has culminated in the development of eleven varieties and many other germplasm lines are in the pipeline.

NIAB Mung 28 was the first mutant variety released in Pakistan during 1983. Afterward in 1986 four mutant varieties were released, two for general cultivation i.e., NM 121-25 and NM 19-19 and two short duration i.e., NM 13-1 and NM 20-21 as catch crop especially for rice tracts. Three other mungbean varieties were also released by using mungbean germplasm evolved at NIAB. Later on during 1990 and 1996 bold seeded varieties like NM 51, NM 54 and NM 92 were released having very high yield potential and resistance to Mungbean Yellow Mosaic Virus (MYMV) derived from bold seeded susceptible germplasm. Among these bold seeded varieties NIAB MUNG 92 proved to be very versatile not only grown in Pakistan for a longer period as well as well adapted for cultivation by neighboring countries like India, Sri Lanka, Burma and Nepal. In Bangladesh it was approved with the name of BN 5 for general cultivation. During 2006 another bold seeded variety NM 2006 was developed by using exotic bold seeded germplasm and local adopted variety. These high yielding, early and uniform maturing varieties with the additional characteristics of determinate plant growth habit and resistance to diseases can be grown successfully as catch crop after wheat harvest and before rice plantation and as intercrop in sugarcane or in other crops like cotton. Due to these qualities the mungbean germplasm developed by NIAB is covering almost more than 90 % area of Pakistan and with the introduction of NIAB varieties since 1983 the area and production has increased almost three times in the country.

The research work progressed and during 2011 on 26 July 2011, a candidate line "NIAB MUNG 2011" was approved by Punjab seed council. This variety was developed through crossing of an exotic bold seeded accession, VC 1482E, susceptible to mungbean yellow mosaic virus of Thailand origin with a small seeded local variety NM 20-21 evolved by NIAB, Faisalabad during 1986. NIAB Mung 2011 is an early maturing (65-75 days), short stature and determinate plant growth habit. Moreover NIAB Mung 2011 had achieved 11-25% higher seed yield in different set of experiments conducted in different ecological zones as compared to standard check varieties and high protein contents (6.76% higher). It has also shown resistance to most of the diseases including mungbean yellow mosaic virus and insect pests. NIAB Mung 2011 has a yield potential of 2500 kg ha^{-1} and can be grown successfully in the districts of Layyah, Bhakhar, and Mianwali both in spring and summer seasons. Hopefully the release and cultivation of NIAB MUNG 2011 will be definitely helpful to increase and sustain the production and economy of the growers as well as the country.

Source: Ghulam Sarwar, Deputy Chief Scientist/Head, Plant Breeding and Genetics Division; Ghulam Abbas, Sr. Scientist; Dr. M. Jawad Asghar, Sr. Scientist, Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad, Pakistan; Email: gsarwar_niab@yahoo.com

Current Status and Future Prospects of Pulse Production in SAARC Countries

Lentil, blackgram and mungbean are the first research priority pulse crops in SAARC countries

Regional Workshop on **"Current Status and Future Prospects of Pulse Production in SAARC Countries"** was held with the objectives to share ideas/experiences and formulate regional plans of action and strategies for enhancing pulse production in South Asian countries. SAARC Agriculture Centre (SAC) organized this regional workshop in association with Nepal Agricultural Research Council (NARC) and Department of Agriculture (DOA), Nepal from 24-25 October 2011 in Kathmandu, Nepal. Secretary Mr. Uma Kant Jha, Ministry of Agriculture and Cooperatives (MoAC), Government of Nepal; Mr. Tareque Muhammed, Director (ARD), SAARC Secretariat; Mr. Ram Prasad Pulami, Governing Board (GB) Member from Nepal for SAC and Training Director, Directorate of Agricultural Training, Government of Nepal; Dr. Abul Kalam Azad, Director, SAC; Dr. Shyam Kishor Sah, Director General and other senior officials of DOA; Directors and senior scientists of NARC; six focal point scientists from Bangladesh, India, Bhutan, Nepal, Pakistan and Sri Lanka and SAC personnel were present in the inaugural session of the workshop.

Secretary Mr. Uma Kant Jha attended in the inaugural session as chief guest. In his inaugural speech, he emphasized that pulse plays very important role in the diets for all SAARC countries, without pulse probably we cannot imagine a complete diet in our daily food. Mr. Jha said that unfortunately, in recent days, the prices of the pulses has gone up very high, almost unaffordable to common households, indicating the production of pulses is not adequate to fulfil the market demand. It means, all the concerned authorities, scientists, technicians and producers now should think and prepare strategies how to produce more pulses, so every household can have pulse in their diets. There is higher demand of pulses in the region, but the productivity and production of pulse in our SAARC countries are low. Now, it is right time to have a discussion on how to increase the production and productivity in pulses. He suggested that we should focus on strengthening research and production support systems to farmers. Mr. Jha hoped that this regional workshop would be able to find out the ways to increase pulse production and productivity and strategies to increase pulse productivity and production in the region.

Mr. Tareque Muhammed, Director (ARD), SAARC Secretariat, was also present in the inaugural session as special guest. In his inaugural address, he urged that pulse is the cheaper source of protein that makes nutritional security in the region as well as poverty alleviation of the SAARC member countries. Mr. Tareque also emphasized on the exchange of germplasm among SAARC countries.

Mr. Ram Prasad Pulami also attended as guest of honour in the auspious occasion. In his speech, he told that pulses are major source of dietary protein in South Asia and play a significant role in sustainable agriculture besides providing nutritional security for poor masses of the region.

Dr. Abul Kalam Azad, Director, SAC welcomed all distinguished participants in the inaugural session of the workshop. Dr. Azad elaborated the objectives of the workshop. He further emphasized that pulse is an important source of protein. It is cheaper in comparison with other sources of protein like milk, meat and eggs. Most of the Asian population mainly depend on pulse for their daily diet to meet up their protein requirement. But the per capita availability of pulse is very low (about 10 g/day) which is one fifth of the requirement. This might be due to low productivity and less crop coverage around the region.

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Current Status and Future Prospects of Pulse Production in SAARC Countries

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Dr. Shyam Kishor Sah, Director General, Department of Agriculture presided over the inaugural session. He told that nutritional food security and poverty alleviation are not possible without increase of pulse production and productivity in the region.

The regional workshop was completed with four technical sessions. Nine papers were presented in the technical sessions including a keynote paper on the first day. Bangladesh paper entitled "Status of pulses in Bangladesh" was presented by Dr. Md. Matiur Rahman,

Pulse Scientist and Ex-Director General of Bangladesh Agricultural Research Institute (BARI); Indian country status report on "A Status Report on Pulses in India with a Focus on the New Millennium" was presented by Dr. Ms. Usha Tuteja, Director, Agricultural Economic Research Centre, University of Delhi; Bhutan country report on pulse was presented by Mr. Sangay Tsewang, Senior Research Officer, RDC-Bajo; Nepal country status report on "Status and Future Prospects of Pulses in Nepal" was presented by Dr. Renuka Shrestha, Senior Scientist/Coordinator, Grain Legume Research Programme; Pakistan Country status report on "Current status and future prospects of pulse production in Pakistan" was presented by Dr. Muhammad Zubair, National Coordinator, National Agricultural Research Centre, Islamabad, and Sri Lankan paper on "Current status and future prospects of pulse production in Sri Lanka" was presented by Dr. P.M. Wijeratne Banda, Director, Field Crops Research and Development Institute, Maha Illuppallama. The two special papers were presented by Prem Nidhi Sharma, Entomology Division, NARC on "Studies on Management of Pulse Beetles using Botanicals in Nepal and S. Joshi, Plant Pathology Division, NARC presented the paper on "Grain Legume Diseases of Nepal and their Management". Dr. Niranjan Prasad Adhikari, Director (Crops and Horticulture) NARC presented the keynote paper on "Current Status and Future Prospect of Pulse Production in SAARC Countries". Participants from NARC, Ministry of Agriculture and Cooperatives, Department of Agriculture, Government of Nepal were present in the workshop for two days.

On the second day, all resource speakers from SAARC countries and all participants discussed on the four thematic areas: a) Research issues; b) Extension and development issues c) Policies; d) Capacity building/visit/seminar issues. After a whole day brain storming sessions, the participants came up with a number of excellent recommendations considering the matrix developed by all resource speakers from SAARC member countries and participants. Dr. Tara B. Ghimire, Senior Scientist, NARC facilitated the group discussions and Ms. Nasrin Akter, Senior Program Officer (Crops) coordinated the program from SAC as well as participated as facilitator.

As per matrix (compatibility model), lentil, blackgram and mungbean are common in the region and are the first research priority crops in SAARC countries for pulse production. Blight, Mungbean Yellow Mosaic Virus (MYMV), hairy caterpillar and rust diseases and low yield are identified as the major constraints of lentil, blackgram and mungbean in South Asia. Disease resistant and high yielding varieties are the varietal expectation and diseases management research is the technological expectation of SAARC countries.

In the concluding session, under the chairmanship of Mr. Lilaram Poudel, Deputy Director General, Department of Agriculture, Government of Nepal. Dr. Abul Kalam Azad, Director, SAC, thanked NARC for support and holding this workshop.

The following recommendations were formulated for adoption by the member states and Dr. B. Mishra, Council

Member, NARC and ex-Executive Director of NARC attended as chief guest in the concluding session. Dr. Renuka Shrestha, NARC presented the workshop recommendations to the audience.

The major recommendations emerging out of this workshop are given below:

Research Issues

A. Variety/Seed

- Development of new pulse varieties, agronomical practices as per regional priority
- Development of high input responsive varieties (Rajma, Mungbean) for irrigated areas to compete with other crops wherever is possible
- Research should be strengthened towards evolving improved disease resistant varieties of pulses
- Strengthening research for quality source seed production

B. Technology Generation

- Integrated disease, insect and weed management for better harvest
- Appropriate production technologies should be developed to increase the productivity and reduce cost of production of pulses (such as mechanization)
- Enhance inclusion of pulses to diverse niches in the cropping systems
- Enhance BNF research to increase productivity of pulse and their contribution to the system
- Research on botanicals in controlling stored grain pests of pulses
- Explore and promotion of the high nutrition content pulses

Extension and Development Issues

- Promotion of pulses with complete package of practices within each country through mission projects
- Promotion of mechanization in planting, harvesting and post harvest processing
- Adequate and timely supply of source seed of improved varieties to farmers
- Strengthening seed producing farmers' group and cooperative
- Improve farmer's awareness and knowledge through farmer's training and participatory demonstration, mass media
- Establish and strengthen the existing value chain niches products in SAARC countries

Policy Issues

- Form different nurseries taking released varieties of different pulses from SAARC countries for different traits for evaluation and selection of appropriate genotypes by individual country
- A cell may be formed at the SAC for coordinating and facilitating the pulses improvement activities within SAARC Region
- Inclusion of pulses in the National Food and Nutritional Security Programme of SAARC member countries
- Development of appropriate marketing channel including support price for the farmers
- Incentives for pulse growers in the form of credit with low interest rates, subsidy on inputs
- Exchange of technical expertise, genetic materials, technical cooperation and technologies among SAARC countries
- The countries should develop collaborative research programs with more emphasis on the common technical problems of the member countries
- Cooperation with CGIAR centers for pulse promotion should be strengthened through SAC

Capacity Building/Visit/Seminar

- Post graduate/PhD studies in pulse crops for human resource development (HRD) for strengthening research and development (R & D) on pulses
- Regional trainings on pulse technologies
- Organize regional conferences, meetings and seminars on pulses for sharing experience, knowledge, exchange of views among pulses scientists, extension workers, farmers, private companies, journalists within the region.

Contribute to SAARC AgriNews

SAARC AgriNews is a widely circulated Newsletter devoted for disseminating agricultural research and development findings as well as information on applied technology for the farmers of South Asian region. SAARC Agriculture Centre has been publishing this quarterly Newsletter (formerly SAIC Newsletter) since 1991 and distributing it to about 7,000 readers in SAARC member countries. The Centre has been distributing SAARC AgriNews to the relevant agricultural institutions, scientists and extension service providers of SAARC member countries for better livelihood of the farmers free of cost. Please send your articles, success stories and news on applied research, extension activities, proceedings and/or recommendations of seminars, symposium, consultations and workshops in the field of agriculture with relevant photographs either by post or through e-mail. Please note that unaccepted articles are not returned to the authors.

Oil Palm Cultivation in India

Production Technology

Nursery management techniques were perfected for raising healthy oil palm seedlings. Soil, sand and farm yard manure or oil palm waste compost in 1:1:1 proportion was found to be an ideal potting mixture for growing seedlings. A fertilizer dose of 10-5-5 g N, P_20_5 and K_20 per seedling was found optimum. Application of fertilizers in equal splits at three monthly intervals was suitable for optimum performance. Studies on the age of seedling at planting revealed that plant height and girth were significantly higher when seedlings were planted at 9 and 12 months. The levels of physiological parameters were higher in 12 month old seedlings followed by 9 month old seedlings.

Sap flux in oil palm with response to environmental variables viz., evapo-transpiration and vapour pressure deficit increased gradually from 9.00 hours onwards and reached peak during 13.00-14.00 hours and then decreased gradually. Evapo-transpiration and vapour pressure deficit also showed similar trend as that of sap flux. Sap flux measurements could give vital leads in developing an approach for monitoring the environmental responses in oil palm.

Carbon Sequestration studies in eleven mature oil palm hybrids belonging to ASD Costa Rica, Ivory Coast, Papua New Guinea and Palode revealed that standing above ground biomass in different hybrids ranged from 55.08 to 91.58 tonnes/ha. The highest biomass was recorded in ASD Costa Rica hybrid Deli X Lame, while lowest was also in ASD Costa Rica hybrid (Deli X Avros). The amount of carbon sequestered by the hybrids ranged between 17.98 and 35.44 tonnes/ha with Papua New Guinea and Ivory Coast hybrids sequestering the highest and lowest carbon contents respectively.

Crops like maize, tobacco and banana were found to be most profitable and compatible intercrops in oil palm based cropping systems during the juvenile phase, while, cocoa was found to be an ideal companion crop in adult oil palm plantations. Agro-forestry systems in oil palm involving multi-species crop combinations with cocoa, black pepper, cinnamon and anthurium have been established to maximise productivity and improve soil and water conservation in undulating terrain of high rainfall areas. Growing sunnhemp in basins of young oil palm provides a better micro-environment to the crop during summer months besides fixing atmospheric nitrogen and addition of organic matter.

Technique of vermin-composting has been perfected for oil palm plantation wastes, which are available in plenty in oil palm plantations. It was found that almost 90 % of N, 50 % of P and 75 % of K requirement of palms could be met through compost obtained from bio-waste recycling process. A combination of one-thirds of nutrient requirement as inorganic fertilizers and two-third of requirement as palm waste compost was ideal and economical.

Disaster management studies indicated that, within the course of three years of cyclone, uprooted palms, that were replanted, started yielding through application of recommended doses of fertilizers and irrigation. With proper care and management of oil palm plantations (regular application of water through drip and quarterly application of fertilizers @ 1200:600:1800:500g N, P, K, Mg per palm/year and need based boron application @ 50 g/ palm/year, 50 kg FYM/palm /year, it is possible to get 8 to 11 tonnes FFB/ha/annum in the first year of harvest i.e. three years after planting.

Nutrient Management

Based on the long term experiments conducted in AICRP on Palms Centres, the following fertilizer schedules were recommended for oil palm cultivation in different regions:

- Coastal Tamil Nadu region : 1200: 600: 2700 gram NPK /palm/ year
- Thungabadhra Command area of Karnataka State : 1200: 600: 1200 gram NPK/ palm/ year
- Konkan coastal region in Maharashtra State : 1200: 600: 2700 gram NPK /palm/ year
- Coastal Andhra Pradesh region : 1200: 600: 2700 gram NPK /palm/ year

A fertilizer dose of 1200-600-1200g N, P_20_5 and K_20/palm/year applied in two equal splits was found optimum for adult palms, under rainfed conditions. Diagnosis and Recommendation of Integrated Systems (DRIS) was developed for oil palm. Potassium nutrition was found critical under tropical conditions.

Under irrigated conditions, when initial yields of 15 tonnes of FFB/ha/yr or more were observed, it is advisable to apply 20% more fertilizer than the recommended dose in 3-4 splits. Boron deficiency symptoms were manifested in the form of hook leaves, rounded frond tips, blind leaf, leaflet shatter, bristle tip, crinkled leaf and fish bone leaf structure. The boron deficiency could be corrected by application of borax in three splits @ 50, 50 and 100 g/palm. Based on the influence of weather parameters, yield prediction models were worked out

Water Management

Results from irrigation experiments have indicated that when irrigation was restricted to replace evaporation losses by 100 per cent either with drip or micro jet, crop growth and yields were superior to that of basin irrigation. Oil palm requires at least 300-350 litres of water per palm per day during peak summer seasons. Irrigating palms at the rate of 90 litres/palm/day during summer months is an essential requirement for oil palm cultivation.

Crop Protection

Roving survey on the pests of oil palm in various states of India revealed that rhinoceros beetle was most frequently observed pest in oil palm plantations, which was found to migrate from coconut and palmyrah palms. Leaf eating caterpillar damage was observed very severe in some plantations with yield loss up to 37 % extending to the following two to three years. Management measures for rhinoceros beetle and red palm weevil have been developed. Nylon nets in plantations were effective in reducing the bird damage. Green and violet coloured nets could attract and trap many birds followed by snuff colour. A wild boar scaring devise was developed for oil palm nurseries and young plantations. Use of bamboo noose traps was found to reduce the burrowing rat population. Single application of Warfarin could reduce only 50% of rat incidence within one week period compared to Zinc phosphide which recorded more than 75% reduction. Two applications of Zinc phosphide with no gap between the applications was found effective. Infestation of rhinoceros beetle was brought down from 8.25% to 1.8% by release of baculovirus infected beetles. Molecular studies of different strains of bio control agents used for management of oil palm pests (carried out using SDS PAGE) revealed that both Trichoderma viride and *Beauveria bassiana* obtained from NBAII were effective in causing infection within a shorter period compared to strains of NRCOP and DOR.

Oil palm is an entomophilous crop and pollinating weevil *Elaeidobius kamerunicus*, introduced from Malaysia has established well in all agroclimatic zones of oil palm in India. Relative humidity was observed as a critical factor for the incidence of pollinating weevil. No weevil population was observed when RH was reduced to less than 40%. It was also observed that *Beauveria bassiana* was more harmful to weevil population compared to that of *Metarhizium anisopliae*.

Among the diseases recorded in oil palm plantations, bud rot, stem wet rot, upper stem rot, basal stem rot and spear rot diseases are serious though the percent incidence is low, causing mortality of the palms whereas bunch rot and bunch failure are observed seasonally causing yield losses.

Standardized seed dressing techniques are found to prevent microbial spoilage of seeds and sprouts during storage and germination process. Spear rot disease, endemic to Kerala was found to be caused by Phytoplasma and spread by plant hopper *Proutista moesta* and lace bug *Stephanitis typica*. Stem surgery technique for management of stem wet rot and basal stem rot have been found successful. Cross infectivity of organisms from coconut to oil palm has been observed in both basal stem rot and spear rot diseases of oil palm i.e., phytoplasma associated with root (wilt) disease causing spear rot and Ganoderma causing basal stem rot. Molecular characterization of *Ganoderma sp* causing Basal Stem Rot (BSR) disease in oil palm revealed polymorphism. All the isolates were confirmed by PCR amplification with two pairs of primers - Gan1 & Gan2 and Gan ET & Gan ITS.

Oil palm, a crop which has emerged as the largest oil yielding crop over a period of five decades has become the most economic crop in the global vegetable oil for food, industrial purpose as well as bio diesel. India too could emerge as one of the major producers of palm oil by bringing out 2.00 million ha in the potential areas as irrigated crop and there by producing 7.00 to 8.00 million tonnes of palm oil and 0.7 to 0.8 million tonnes of Palm Kernel Oil.

Source: Dr. S. Arulraj, Director, Directorate of Oil Palm Research, Pedavegi, Andhra Pradesh, India

SAC Provides ABIS through e-mail

SAARC Agriculture Centre has been providing Agricultural Bibliographic Information Service (ABIS) on different CD-ROM database. The following CD-ROM databases are available with SAC: CROP CD (2007/07), HORT CD (2008/06), VET CD (2003/11), PLANT GENE CD (2008/08), SOIL CD (2007/04), PARASITE CD (2005/07), FSTA (2007/10), CAB ABSTRACT (2005/11), TREE CD (2004/10), FOREST SCIENCE CD (2008/07), ANIMAL PROD. CD (2008/11), VETEARINARY CD (2008/8), AGRICOLA CD (2007/6) is also subscribed for renewal. If you wish to avail ABIS, please send your request to abis@saarcagri.net addressing the Director, SAC. Please mention the keywords, title of CD-ROM database and the range of years for which you need the references.

National Agricultural Extension Systems in SAARC Countries - An Analysis of the System Diversity

One line control of extension service with improved coordination with relevant stakeholders

A two day Regional Consultative Workshop on **"National Agricultural Extension Systems in SAARC countries - An Analysis of the System Diversity"** was organized with the following objectives as to study the existing national agricultural extension system; to document the methods, approaches and models of extension work; to study the research - Education -extension -farmers linkage; to compare the NAES diversity among the member countries; to identify the strength and weakness of the NAES; to examine the most effective extension approach within the region; to study the possibility of modifying the existing extension system; to develop extension system in individual member countries based on shared experiences; to document a chronological of the development of agriculture extension system

SAARC Agriculture Centre (SAC) organized this Consultative Workshop in collaboration with the Information & Communication Services and the Council of RNR Research of Bhutan, Ministry of Agriculture and Forests, Bhutan held during 23-24 November 2011 in Thimphu, Bhutan. Lyonpo Dr. Pema Gyamtsho, Honouraable Minister of Agriculture and Forests, Government of Bhutan, Dr. Ugyen Chewang, Hon'ble Secretary, National Environment Commission, Bhutan, Government of Bhutan; Ms. Singye Wangmo, Honourable Member, SAC Governing Board and Program Director, Information & Communication Services (ICS), Ministry of Agriculture and Forests, Bhutan; Dr. Abul Kalam Azad, Director, SAC; Professor Dr. Ramesh Chand, Honourable Member, SAC Governing Board from India and Director, National Centre for Agricultural Economics and Policy Research (NCAP), India; Keynote Speaker Mr. Chencho Norbu, Director, Department of Agriculture, Bhutan;; Distinguished Resource Persons from six focal point scientists from Bangladesh, India, Bhutan, Nepal, Pakistan and Sri Lanka and Dr. Manzoor Hussain Dar, Senior Associate Scientist, Seed Up-scaling and Coordination (STRASA) project, International Rice Research Institute; distinguished participants from Bhutan, officials from Ministry of Agriculture and Forests and Head of the

Institutions, scientists from Bhutan and SAC personnel personnel were present in the inaugural and concluding session of the consultative workshop. Ms. Nasrin Akter, SPO (Crops), SAC coordinated the program from SAC.

The regional consultation workshop was completed with two technical sessions and thematic group discussion. Total nine papers were presented in the technical sessions including keynote paper on the first day. Bangladesh paper on "National Agricultural Extension System in SAARC Countries - An Analysis of the System Diversity in Bangladesh was presented by Dr. Md. Matiar Rahman, Former Deputy Director (Training Wing), Department of Agricultural Extension, Dhaka; Indian country status report on "National Agricultural Extension System in India" was presented by Professor Dr. Ramesh Chand, Director, NCAP, New, Delhi; Bhutan country report on National Agricultural Extension System in Bhutan presented by Dr. Kailash Pradhan, Thimphu; Nepal country status report on "National Agricultural Extension Systems in Nepal-An Analysis of the System Diversity " was presented by Dr. Nil Kantha Sharma; Pakistan country study report on "National Agricultural Extension Systems in SAARC Countries-An Analysis of the Systems Diversity, a case of Pakistan," was presented by Dr. Waqar Malik, PARC, Islamabad, and Sri Lankan paper on "National Agricultural Extension Systems of Sri Lanka "was presented by Dr. Rose Rupasinghe Samuel, Deputy Director, Department of Agriculture. Two special papers were presented on "Agriculture Extension Services in Bhutan by Mr. T.N Acharya and the OGTP model-an approach to agriculture growth in Bhutan presented by Badrinath (BN) Bhattarai, DoA, MoAF, Bhutan

Participants from Information & Communication Services and the Council of RNR Research of Bhutan, Ministry of Agriculture and Forests, Bhutan were present in the workshop for two days.

On the second day, all resource speakers from SAARC countries and all participants discussed on the four thematic areas: a) Research- Education -Extension farmers linkages; b) Agricultural Extension System diversity in SAARC countries c) Policies; d) Most effective extension approaches in SAARC countries. After a whole day brain storming sessions, the participants came up with a number of excellent recommendations by the total resource speakers from SAARC member countries and participants. Field visit to RNR Extension Centre, Semtokha and Field visit to RDC, Yusipang was made on second day of the workshop.

The resource speakers of the SAARC member countries and all participants from Bhutan, SAC and IRRI discussed the themes as follows in the group discussion

- Chronological development of agriculture extension system
- Existing national agricultural extension system
- Methods, approaches and models of extension
- Research - Education -extension -farmers linkage
- Comparison of the NAES diversity
- The strength and weakness of the NAES
- Effectiveness of extension approach within the region
- Human resource development

History of the chronological development of agriculture extension

- Preference for one line of control of extension service
- System vs services

Methods, approaches and models of extension work practiced

- Different models and approaches and the need to blend the models and to also take into considerations the social aspects
- the need to develop social skills to respond to the situations
- Farmers should be encouraged to adopt the technologies by providing the required facilities
- Options should be made available for farmers to choose a technology
- Priority in the establishment of group and cooperative societies
- Use of participatory approaches an alternative to limited number of extension agents
- OGTP approach

The Research-Education-Extension-Farmers linkage or promoting incomes and management of scarce resources

- Growing trends of pluralism in delivering agric extension services

Comparison of the NAES diversity

- All the extension experiences of the countries are revolving around the same practices

The strength and weakness of the NAES

- High cost low impact extension program
- Inadequate technical qualifications of grassroot level extension workers
- Limited emphasis on the woman-extension agents (vulnerable)

Effective extension approach within the region

- suggestion to blend the public and NGO sectors
- Common forum to address feedback from the front line extension personnel
- Effective monitoring and evaluation system on the performances of field workers

Human resource development

- IT is not the replacement of the human resources (extension personnel)
- Establishment of extension training centres
- Potential-based placement of extension personnel

The major recommendations emerging out of this workshop are given below:

Issues of National Agriculture Extension System	Recommendation
• Increasing engagement of Extension personnel in non-extension ad hoc activities	One line control of extension service with improved coordination with relevant stakeholders
• Devolution of extension system to local government Systems vs. Services: extension system with weak delivery mechanism	Improve the extension services delivery methodology in the local context
Inadequate financial support for agricultural extension activities	Prioritize investment in extension activities, methodologies and approaches
Involvement of extension personnel in input supply deviating focus on extension service delivery	Extension needs to be knowledge-based
Methods, Approaches and Models of Extension	
Large variety of models are in practice in different SAARC member countries	Member Countries need to adopt a blend of approaches / models in vogue in neighbouring countries
Inadequate facilities limit the extension potential for dissemination of technologies to the farmers	Farmers should be encouraged to adopt technologies by providing the required services and facilities
Limited technology options for farmers to choose	Technology options should be made available for farmers to choose and use as per their preferences
Farmers' group and co-operative societies are playing significant role in the diffusion of information	Extension system may incorporate the good practices of NGOs and private sector in applying participatory approach and encourage working with NGOs and civil society organizations

Issues of National Agriculture Extension System	Recommendation
Limited extension workers against wide-range of extension mandate and coverage	Use of participatory approaches an alternative to limited number of extension agents
Extension system lacks expertise in commercial farming	The role of extension systems may be expanded to include dissemination of commercial farming. The emulation of One-Geog-Three-Product (OGTP) approach being practiced in Bhutan can be a good model to be replicated
Inadequate use of ICT tools for technology transfer	Investment in ICT and human resource development to enhance
Research-education-extension-farmer Linkages	
Growing trends of pluralism in delivering agricultural extension services	Review of impact of pluralism in delivering agricultural extension services
Wide yield gap between research and farmers' fields	Participatory on farm trials on new technologies to be adopted
Poor responses from farmers on the use of technologies	Promote generation of location-specific and need-based technologies through participation of relevant stakeholders
Scattered settlements and long distance from extension centres	Additional deployment of extension personnel and increase number of service centres / improved access
Confusion and duplication in the areas of activities linkages and coordination - different agencies adopting different practices	Integration and realignment of services sectors and promote one line of control
Research-education-extension-farmers linkages are tenuous and scarce	Extension system must institutionalize these linkages
Regional forum greatly enhance understanding and exchange of ideas and information and connectivity	An extension forum maybe instituted under the aegis of SAARC
National Agricultural Extension System Diversity	
Crops, livestock, poultry, fisheries and forestry sub-sectors engaged in delivering similar services to the same clients	All these Departments may be placed under one Ministry
Inadequate technology testing and dissemination mechanism	Model like Krishi Vigyan Kendras (KVK), India, maybe replicated in member countries
Weaknesses of the National Agricultural Extension System	
Inadequate technical qualifications of grassroot level extension workers	Increase frequency of in-service training and up-grade qualification from diploma to degree level
Gender inequity - limited woman EAs considering them as vulnerable group	Encourage greater participation of qualified woman EAs
Poor input supply system and lack of agricultural insurance scheme	Adopt best mechanism and practices functional in the SAARC member countries
Poor agriculture market system	Proper networking of marketing agricultural products in the SAARC / SAFTA
Inadequate central repository for knowledge management at the national and regional level	Strengthen networking and central repository for information sharing for scientific, local knowledge and socio-cultural exchange
Effectiveness of Extension Approaches	
Lack of common forum to address feedback from the front line extension personnel	Develop and strengthen common forum / toll free communication system among the front line extension personnel

Issues of National Agriculture Extension System	Recommendation
Current phenomena of commodity and supply driven approach lacks assessment of technical potential of the extension programme	Shift from commodity and supply driven to demand and market driven extension
Extension Policy Issues	
Inappropriate / lack of institutional reforms and weak coordination and support	Align functional-based institutional reforms and strengthen coordination and support services
Lack of policy in public private partnership	Re-visit / frame national extension policy and incorporate coordination mechanism keeping in view the important roles of the private sector in extension services delivery
Accountability vested more to the donors rather than to farmers resulting in less attention dedicated to the farmers	Shift from donor accountability to farmer- centered accountability
Extension personnel lack knowledge and broader understanding on emerging global / regional issues	Create awareness and understanding on emerging issues so that extension personnel are able to address the global / regional issues locally (climate change, global warming, WTO, organic farming, etc.)
Human Resource Development	
Fallacy of IT as the replacement of the human resources (extension personnel)	IT is a support tool for extension and should be used to enhance delivery of services
Limited number of (in-service) extension training centres	Outsource the in-service extension training to private sectors
Mismatch on the placement of extension personnel in accordance with production potential (one EA one block)	Commodity-based and knowledge-based placement of extension personnel
Monitoring and Evaluation System	
Absence of appropriate monitoring and evaluation system de-motivates the field workers	Effective monitoring and evaluation system to monitor the job performances of field workers and also to assess the field impact
Lack of timely reporting / recording of field activities and unrealistic field data	❖ Put in place standard reporting and recording mechanism supported by mobile M&E team ❖ EAs should be properly trained on data collection and simple data statistics

Bhutan Foreign Secretary visited SAC

His Excellency Dasho Daw Penjo, Hon'ble Foreign Secretary, Ministry of Foreign Affairs, Thimphu, Bhutan made an official visit at the SAARC Agriculture Centre (SAC) on 22 November 2011, During his visit Dr. Abul Kalam Azad, Director, SAC presented the Centre's activities and future priorities in agricultural research and development in South Asia. Professionals, Technical and GSS staff attended the program.

Role of PARC in Agricultural Research and Development in Pakistan

Dr. Iftikhar Ahmed, Chairman, Pakistan Agricultural Research Council (PARC) presented a seminar on **"Role of PARC in Agricultural Research and Development in Pakistan in particular and SAARC Region as a whole"** on 18 December 2011. SAARC Agriculture Centre (SAC) organized this seminar at Bangladesh Agricultural Research Council (BARC) Conference Room, Farmgate, Dhaka.

Mr. C.Q.K. Mustaq Ahmed, Secretary, Ministry of Agriculture, Government of Bangladesh attended this seminar as Chief Guest. Dr. Wais Kabir, Executive Chairman, BARC presided over the seminar

The 26th Anniversary of the SAARC Charter Day

Jointly observed SAARC Charter Day

The Charter of SAARC is constantly reminding us our endeavors and commitment to assist the member states to prepare the national plans of action to address issues of food security through agricultural development, poverty alleviation, empowerment of women, and human resource development. On this auspicious occasion, SAARC Agriculture Centre (SAC) and SAARC Meteorological Research Centre (SMRC) along with Ministry of Foreign Affairs (MoFA) jointly observed SAARC Charter Day on 8 December 2011 in Dhaka, Bangladesh with due solemnity to commemorate the adoption on SAARC Charter.

In observance of the 26th Anniversary of the SAARC Charter Day on 8 December 2011, the two Centres jointly organized various activities on 08 December 2010 including Essay and painting competition, Seminar, Building and main gate enlightening, Display of the Centre's products and services, Folder with SAARC Charter, writing pad and pen with SAARC Charter Day, participation in Marathon at SAARC Secretariat, Nepal and Rally for raising awareness.

Rally

A rally was organized from the premises of the Banghabandhu International Conference Centre to Bangladesh Agricultural Research Council Complex, Farmgate at 8:00 am on 8 December 2010 to mark the occasion of the SAARC Charter Day. Director, SAC released pigeons from front side of Bangababdhu International Conference Centre just before start of the rally.

A good number of Scientists, Extension Service Providers, SAC and SMRC personnel participated wearing T-Shirt and caps with SAARC Monogram and SAARC Charter Day in the Rally. Sixty participants were present in the Rally.

Seminar/discussion

A seminar/discussion was held at 11:300 am on 8 December 2010 at Bangladesh Agricultural Research Council Auditorium on **"SAARC Agriculture Facing Climate Change"**. Dr. Md. Zainul Abedin, IRRI Representative for Bangladesh and a renowned personality in agricultural sector of Bangladesh presented a paper on **Climate change, agriculture and adaptation options in SAARC Countries** in the seminar. Dr. Wais Kabir,

Executive Chairman of Bangladesh Agriculture Research Council also presented a paper on **Challenges of climate change on agriculture in SAARC Countries**.

Mr. CQK Mustaq Ahmed, Secretary, Ministry of Agriculture, Government of Bangladesh graced this occasion as the Chief Guest and wishes all the success for year ahead to achieve our common goals and believe that the observance of the SAARC Charter Day would further strengthen our unity and promote our regional identity

Mr. Syed Masud Mahmood Khundoker, Director-General (SAARC), Ministry of Foreign Affairs, Government of Bangladesh was also present as special Guest in the seminar.

Dr. Abul Kalam Azad, Director, SAC gave welcome address and Mrs. Anjuman Habib, Director, SMRC gave brief introduction on SMRC on this occasion. Dr. S.K. Pal gave vote of thanks on this occasion

High Officials of various Ministries, Government, Non - Government and Private organizations, Scientists from NARS Institutions and Extension Service Providers of different Departments, Educationist from different Universities, Excellencies representing SAARC Member Countries, Journalists and Media Personnel, Development partners attended this important event. Around three hundred participants attended this programme.

Submit research or review article for SJA

SAARC Journal of Agriculture (SJA), a half yearly publication from the SAARC Agriculture Centre is envisaged to serve as platform for exchange of latest knowledge on breakthrough topics that are of current concern for researchers, extensionists, policy makers and students. It aims to capture the first-hand knowledge on research achievements in the field of agriculture, fisheries, livestock, forestry and allied subjects from the SAARC member countries. Agricultural scientists, policy makers publish their research or review article in this esteemed journal without any page charges or other processing cost. For author's guide lines, please visit our website: www.saarcagri.net.

Submit your manuscript in electronic form via e-mail: sja@saarcagri.net or via post addressing to Editor, SAARC Journal of Agriculture (SJA), SAARC Agriculture Centre, BARC Complex, Farmgate, Dhaka-1215, Bangladesh.

Gaur delivers seminar at SAARC Agriculture Centre

Dr. Pooran Gaur delivered a seminar on **"ICRISAT and its Role in SAARC Agriculture"** at the SAARC Agriculture Centre in Dhaka, Bangladesh, on 20 October.

The seminar was attended by about 30 scientists from the SAC and BARC which promotes agricultural research and development as well as technology dissemination for sustainable agricultural development and poverty reduction in the region.

During his seminar, Dr. Gaur highlighted that ICRISAT has supplied over 810,000 samples of germplasm and breeding lines to SAARC countries, which have in turn contributed to the release of 240 varieties.

Dr. Sandip Pal, Deputy Director (Agriculture), SAC stressed the need to strengthen collaboration between SAC and ICRISAT and to further facilitate dissemination of technologies developed by ICRISAT to SAARC countries.

Regional Training Workshop on Intellectual Property Rights in Agriculture in SAARC Countries at NAARM

Most of the SAARC countries as a member of world trade organization (WTO) are obliged to comply with the agreement on trade related aspects of intellectual property rights (TRIPS Agreement). This requires that member countries provide intellectual property rights (IPRs) in one form or the other in all fields of agricultural technology. SAARC Agriculture Centre (SAC) identified that research in frontier sciences such as agro-biotechnology will require intellectual property protection through patents, plant variety protection, fish and other animal breed protection, and all other forms of IPRs. Public-private partnerships will play an increasing role in the advancement of agricultural research under the IPR regime. The objectives of the training were:

- To train up the SAARC regional scientists and decision makers on IPR in agriculture and allied fields
- To know the intellectual property management and technology transfer /commercialization
- To know the existing IPR laws and legislation in agriculture and allied sectors in SAARC countries
- To protect agricultural innovation (hybrid technology, new variety etc.) in the SAARC countries
- To know patenting of agricultural biotechnology
- Fundamental practices in farming systems and mechanizations in agriculture
- Public research mandate

A total of 19 number of participants from SAARC member countries participated in the training as burning issue like IPR in agriculture. The training broadly covers: IP tool box, IP systems in SAARC countries, Patents as source of information in technology management, Exercise on patent search, Management of agri-biodiversity in IP regime, Plant variety protection in public sector institutes, Technology management for agri-technologies, Translational research and commercialization -case study in agri-biotechnologies and food processing industries, The IP Due diligence process-a real time experience from agri-machinery industry, Agri-Entreprenuership story -NIF case etc. The participants also made institutional visit at ICRISAT, DRR in Hyderabad, India.

Mr. Golam Mustafa, Program Officer participated as well as coordinated the program from SAC. Dr. R. Kalpana Sastry, Head (ARSMP Division) were the principal coordinator from National Academy of Agricultural Research Management (NAARM), Hyderabad, India.

Regd. No. Dhaka 1334

SAARC-Australia project

Cropping systems modelling to promote food security in South Asia

One of the major emerging threats to food security in South Asia is the decrease in or lack of water available for agriculture and the need for improved water productivity in both rainfed and irrigated agriculture. Despite several decades of agricultural research into water productivity, the impact of past research has not reached the level required to safeguard future food production against likely reductions in water availability.

In part this can be attributed to the traditional research and extension approaches prevalent within research institutions in South Asia that are mostly organised along disciplinary boundaries or on a commodity basis. This precludes, or at least makes it harder for farming systems research to take place effectively. Yet a system approach is a prerequisite to addressing cross-sectoral issues such as water scarcity or climate change.

The AusAID-ACIAR funded SAARC-Australia Project on **'Developing capacity in cropping systems modelling for sustainable use of water resources to promote food security in South Asia'** offers Australia's expertise in systems analysis and modelling to build capacity within SAARC agricultural research organisations.

The project aims to undertake more effective research using modelling-supported systems approaches, by establishing a network of agricultural research scientists in SAARC member countries collaborating on cropping systems analysis and modelling. This network will apply farming systems tools such as the Agricultural Production Systems Simulator (APSIM) model to identify a suite of improved crop and water management practices that increase water productivity of representative rainfed and irrigated rice-based cropping systems. At the same time the project aims to strengthen institutional support in the SAARC Agriculture Centre (SAC) for systems analysis and farming systems modelling.

The project commenced in March 2011 for two years including series of training workshops and on hand field training on data collection. It is being led by Commonwealth Scientific and Industrial Research Organization (CSIRO) in collaboration with the International Rice Research Institute (IRRI) and SAC.

Earlier an APSIM exposure workshop was held at SAC during 8-10 August 2011 involving 31 trainees from SAARC member countries. A final core set of 20 trainees was selected to participate in this First Training Workshop during 20-24 November, 2011 at SAC. These 20 trainees will continue training activities through the remainder of the project.

These trainees will continue to receive learning-by-doing training in APSIM, underpinned by a range of activities focussing on acquiring high quality data sets, learning how to parameterise APSIM using this data, and then carrying out scenario analysis with the parameterised model to help select management options to improve water productivity within their local rice-based farming situations.

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Tel : 880-2-8115353, Fax : 880-2-9124596, E-mail : sac@saarcagri.net