ISSN 1607-8317

SAARC

SAARC AGRINEWS

Vol. 7, Issue 3 (July-September, 2013)

Promotion of Agricultural Research and Development in SAARC member countries

A Quarterly Newsletter of SAARC Agriculture Centre (SAC)

Editorial

Most countries in the South Asian Region are aware of the significant role of biotechnology for fulfilling the food and nutrition needs of their people. Along with other biotechnologies, genetic modification technology has been adopted by a number of countries in the world. The role of genetically modified (GM) crops for food security is the subject of public controversy. GM crops could contribute to food production increases and higher food availability. There may also be impacts on food quality and nutrient composition. Growing GM crops may influence farmers' income and improvement in their economy resulting in greater access to food. Smallholder farmers make up a large proportion of the undernourished people worldwide. Several studies focus on this aspect and provides the first ex post analysis of food security impacts of GM crops at the micro level. We use comprehensive panel data collected over several years from farm households, where insect-resistant GM cotton has been widely adopted. Controlling for other factors, the adoption of GM cotton has significantly improved calorie consumption and dietary quality, resulting from increased family incomes. This technology has reduced food insecurity by 15–20% among cotton-producing households. GM crops alone will not solve the hunger problem, but they can be an important component in a broader food security strategy.

Considering agricultural research and development issues, trait specific genes for biotic and abiotic stress tolerance might be identified and isolated by using genomics and bioinformatics. Sharing of technology and collaboration of research among SAARC countries with respect to virus, fungus, insect and bacterial resistance in field crops and abiotic stresses like salanity, heat, cold, submergence and waterlogging may be enhanced. Exchange of expertise among SAARC countries in molecular breeding, MAS and transformations are recommended in a regional consultation by SAC. Therefore, extension and marketing, institutional capacity building and training of trainers for adoption of tools and techniques of modern biotechnology were also recommended. Further, creation and strengthening of research-extension -farmers-consumers linkages are needed. Keeping in view the policy matters, uniform GMO policy and networking among Biotech scientists through meetings and visits in member countries might be conducted to facilitate GMO research and sharing of released GM crop varieties for testing and adoption. Members who don't have Biotech Research Centre may be encouraged to establish centre of excellence in Biotechnology. To promote GM products, it is imperative to create public awareness among all stakeholders e.g., policy makers, NGOs, Media with the inclusion of farmers, farmer bodies and end-users through education and campaign on usefulness of GM technology. Finally, existing bio-safety rules and regulation in SAARC member countries should be documented for strenghthening national biosafety systems by SAARC Agriculture Centre (SAC).

Issue Highlights

The Seventh GB Meeting of SAC

The Inaugural Session of the Seventh Meeting of the Governing Board (GB) SAARC Agriculture Centre (SAC) was held in Ruposhi Bangla, Dhaka on 23 September 2013. The technical session was held in SAARC Agriculture Centre (SAC), Dhaka from 24 - 25 September, 2013. The inaugural session of the Seventh Meeting of GB was presided over by Dr. Abul Kalam Azad, Director, SAARC Agriculture Centre, Dr. S M Nazmul Islam, Secretary, Ministry of Agriculture, Bangladesh graced the inaugural session as Chief Guest; Mr. Abdul Motaleb Sarker, Director General (SAARC & BIMSTEC), Ministry of Foreign Affairs (MOFA), Dhaka was Special Guest on this occasion and Mr. Tareque Muhammad, Director, SAARC Secretariat represented the Secretary General of SAARC. The GB Members from Bangladesh, Bhutan, Nepal and Sri Lanka were present. Rest of the country officials were represented by their respective Embassy/High Commissions in Dhaka, Bangladesh.

Mr. Tareque Muhammad, Director, SAARC Secretariat in his inaugural remarks, conveyed the greetings from His Excellency Secretary General, SAARC Secretariat for the successful 7th GB Meeting. Highlighting the contribution of agriculture to GDP and livelihood in the region, the governments of the SAARC region has extended support to cooperate in agricultural development. Considering the vital role of SAC as the principle implementing window for all agricultural related program of the SAARC, he hoped that SAC will deliver what is expected of the centre. He wished that GB members will extend all possible support and guidance to take forward SAC and its program in the coming years.

Guest of Honour, Mr. Abdul Motaleb Sarker, Director General (SAARC & BIMSTEC), MOFA, in his address emphasised the development of Agriculture sector as essential to ensure wider objectives of addressing the issue of food security, nutritional security, eradication of poverty, efficient use of water. He underscored the need for formulating programs and to address emerging challenges posed by climate change, land degradation, natural resource degradation and socio-economic factors. He also urged all the GB members to play their role in enhancing the outputs of the SAC and contribute in development of agriculture sector in the region.

Dr. S M Nazmul Islam, Secretary, Ministry of Agriculture, Bangladesh extended warm welcome to all the distinguished members of the SAC Governing Board on behalf of the Government of Bangladesh and wished them a very successful meeting and comfortable stay in Dhaka. Considering the importance of agriculture in the region he urged the agricultural scientists, extension service providers and policy planners of this region and more specifically the august gathering of professionals to consolidate the scientific endeavours in order to enhance development of agriculture in the region. Dr. Islam also reiterated the need to take advantage of the strength of science in technological innovations in the region to foster higher growth in agriculture.

Dr. Abul Kalam Azad, Director, SAC extended his warm welcome to the Hon'ble Secretary, Ministry of Agriculture, Honourable GB Members, DG (SAARC) and other distinguished guests present in the Inaugural Session of the Meeting. He underlined the significance of the Seventh GB Meeting in formulating programs for addressing emerging challenges in agriculture and allied disciplines in South Asia. Dr. Azad highlighted a number of activities which have been found to be useful e.g. adaptive trials on vegetable and pulses, best practices on soil reclamation, trans-boundary animal diseases, seed forum, fisheries, and national education systems in the SAARC countries. Director, SAC presented the review of the activities of 2012 and progress in implementation during 2013 in the technical session.

In the process of review and approval of the Regular Program, general and specific observations were made during technical session.

The 7th GB recommended the following Programs for 2014

After thorough discussion, the GB Meeting approved the proposed regular and need-based programs/activities and budget for 2014 with the observations

Regular Programs for 2014

- SAARC AgriNews
- SAARC Journal of Agriculture
- SAC Annual Report 2013

- Statistical Data Book for Agricultural Research in SAARC Countries
- In-house research and Publication on Thrust Areas of Agriculture in SAARC Countries
- Food Grain Situation in SAARC Countries & Data for SAARC Food Bank
- Printing of Proceedings of Seminar/Workshop in the field of Agriculture and allied disciplines
- SAARC Charter Day
- Capacity Building & Professional Development
- Programme Building, Monitoring & Backstopping
- Periodic Services (Current Awareness/SDI Services)
- Acquisition of Information materials in Agricultural and allied fields from SAARC member countries and other countries/organizations
- ICT Mediated Communication
- Distribution of Information Materials
- Reproduction of Information Materials, Audio Visual & Dubbing/Subtitling
- Promotional Activities of SAC
- SAARC Agriculture outlook (Dairy)
- SAARC Agriculture Archive
- Internship, exchange visit, exposure visit, graduate research

Need Base Programme for 2014

- Regional Initiation on Improvement of Vegetables and Adaptive Trial in SAARC Countries
- Climate change impact on coastal fisheries and aquaculture in the SAARC Region
- Development and Implementation of the SAARC Pesticide Information Network (SPINet)
- Use of Geo-information Technology for Mapping of land Degradation in SAARC countries
- High Yielding Buffalo Breed Development in SAARC Countries
- SAARC Seed Bank: Regional study for assessment of demand & supply of the common varieties - Rice, Wheat, Maize, Pulses & Oilseeds
- Regional Initiation on Improvement of Pulses and Adaptive Trial in SAARC Countries
- Training on fish processing quality control and hazard analysis and critical control point (HACCP)
- Status of fish prospects of fish feed for aquaculture for development in SAARC countries
- Identification of rice varieties tolerant to abiotic stresses
- Introduction of cluster bean in SAARC Countries
- Regional Adaptive Trial on oilseed in SAARC Countries
- Regional Vegetable Training
- Regional training on advances in poultry nutrition and feed technology
- Regional consultation workshop on mite management of coconut in SAARC countries

Success story in Bangladesh

Increasing crop production through four crop-based cropping system in Bangladesh

Bangladesh has very little capacity of increasing cultivable land but there are some scope of increasing from the present cropping intensity of 190% to 400% by improving the present cropping pattern incorporating short duration crops like; mustard, potato, mungbean and aus rice in the rice based cropping pattern.

Sustainable crop production in Bangladesh through improvement of cropping pattern in rice based cropping system is regarded as increasingly important in national issues such as food security, poverty alleviation and creation of job opportunity . The main challenge of the new millennium is to increase per unit yield by at least 50% through manipulating the limited land resource. In this regard, the challenges for the agronomists are to understand crop production problems and process to develop the best ways of production technologies for the management of problems and sustain production. In case of production agronomy, targeting high yield with high cropping intensity and productivity are the most logical way to raise the total production. In order to produce more food within a limited area, two most important options to be adopted are i) to increase the cropping intensity producing three or more crops over the same piece of land in a year and ii) to increase the production efficiency of the individual crop by using optimum management practices

Oilseed and pulse are the important group of crops which are mostly grown in rabi season. The areas of oilseed and pulse in rabi season are decreased because of increasing cultivation of irrigated boro rice. Recently with the development of short duration rice, mustard, potato and pulse opportunities have been created to accommodate four crops in same piece of land in a year.

Rapeseed-mustard production can be increased 20-25% only replacing traditional variety by high yielding short duration varieties like BARI Sarisha-14 and BARI Sarisha-15 in the existing rice based cropping system.

Pulses are important legume crops in Bangladesh because of their importance in food, feed and cropping systems. They are generally grown without fertilizer since they can meet their nitrogen requirement by symbiotic fixation of atmospheric nitrogen in the soil (Islam, 1991; Senanayake et al., 1987; Zapata et al., 1987; Fried and Middleboe, 1977). Nevertheless, pulses supply a substantial amount of nitrogen to the succeeding non-legume crops grown in rice based cropping system (Rachie and Roberts, 1974; Ahlawat et al., 1981; Kurtz et al., 1984; Sharma and Prasad, 1999).

Potential adoption of mustard, mungbean and potato in T.aman-Fallow-Boro-Fallow cropping system would generate employment and additional income for the rural poor and produce more of these crops utilizing fallow and under used lands in the country. The present experiment was undertaken to study the feasibility of growing four crops in a year in a piece of land by incorporating mustard, potato, mungbean and aus rice in the present cropping pattern. These will help to increase cropping intensity and crop productivity in rice based cropping system, to sustain food security, poverty reduction, resource management and livelihood improvement of the farmers through increasing farmer's income,creating employment opportunity and woman's participation in agriculture.

Field experiments were conducted at the Central research station of Bangladesh Agricultural Research Institute (BARI) for two consecutive years (2011-12 and 2012-13) to study the comparative agronomic performance and economic return of four crops based cropping patterns. The cropping patterns were as follows:CP1= Transplanted Aman rice (BINAdhan-7)– Mustard (BARISarisha-14) – Boro rice (BRRIdhan-28) – Transplanted Aus rice (Parija); CP2 = T. aman rice – Potato (Diamont)– Boro rice–T. aus rice; CP3 = T. aman rice – Mustard (BARISarisha-15) – Mungbean (BARImung-6) –T. aus rice and CP4 = T. aman rice – Fallow – Boro rice – Fallow (Control).Three cropping patterns (CP1, CP2 and CP3) are composed of four crops; and one cropping pattern is composed of two rice crops as control to compare with the other three cropping patterns. The two years results showed that four crops may be grown successfully one after another in sequence in all the three cropping patterns. The highest rice equivalent yield (REY) 34.10 t/ha and 34.02 t/ha were obtained from the cropping pattern CP2 (T. aman rice – Potato – Boro rice – T.aus rice) in 2011-12 and 2012-13 respectively and it was followed by CP1 and CP3 in both the years. The highest gross margin Tk. 267107/ha and Tk. 260439/ha were obtained from CP2 (T. aman – Potato – Boro –T. aus rice) and it was followed by CP3 (T. aman – Mustard – Mungbean –T. aus). The highest MBCR (2.92 and 2.86) were obtained from the cropping pattern CP3(T. aman – Mustard – Mungbean –T. aus). So these four crops based cropping patterns will help to increase cropping intensity, crop productivity and at the same time more employment opportunity will be created for male and female agricultural workers.

From the result of the experiments it may be concluded that three cropping pattern: CP1= Transplanted Aman rice (BINAdhan-7)– Mustard (BARISarisha-14) – Boro rice (BRRIdhan-28) – Transplanted Aus rice (Parija); CP2 = T. aman rice – Potato (Diamont)– Boro rice–T. aus rice; CP3 = T. aman rice – Mustard (BARISarisha-15) – Mungbean (BARImung-6) –T. aus rice are argonomically feasible and economically profitable. Due to growing four crops in a year in the same piece of land, more employment opportunities for farmers will be created. At the same time increased production of rice, potato, mustard and mungbean ensure the food security by adopting these cropping patterns and productivity will be enhanced.

Source: Dr. Md. Rafiqul Islam Mondal, Director-General, Bangladesh Agricultural Research Institute (BARI); Dr. M.A.Aziz, Chief Scientific Officer, BARI ; Dr. F. Begum, Principal Scientific Officer, BARI and Dr. P. Roy, Principal Scientific Officer, BARI

Professional Visits

Mr. Dhan Bahadur Oli, Director (Admn & IPA), SAARC Secretariat, Kathmandu, Nepal visited SAC on 3rd July 2013 and had discussion with professionals about the Centre and proposed project on High Land Agriculture in SAARC member countries.

Dr. Julien Witer and his team visited SAC on 4th July 2013 and discussed about the effectiveness of bio-char in crop productivity with the professionals and technical staff of the Centre.

ICIMOD team visited SAC on 1st July 2013 for organizing joint program on Natural Resource Management with SAC.

High Officials Nepalese team from Ministry of Cooperatives and Poverty Alleviation visited SAC on 18 July 2013. The team was briefed about the activities of SAC

Two Consultants from USAID visited SAARC Agriculture Centre on 26 September, 2013 and a courtesy meeting was held among SAC professionals and technical staff organizing the activities of the Centre.

Mr. Shahjada Khalid, Deputy Director, SAARC Energy Centre (SEC), Pakistan alongwith Mr. Anwarul Islam, Research Fellow of SEC visited SAARC Agriculture Centre on 09 September, 2013. During the visit, a presentation on the activities of SAC was shown.

A team of Students of the University of Patuakhali Science & Technology, Bangladesh visited SAARC Agriculture Centre (SAC) on 4 September, 2013. Dr. Md. Nurul Alam, SPS (PSPD) presented the activities of the Centre as well as about SAARC.

Incidence of Alternaria blight in Chickpea in Karnataka, India

Alternaria blight caused by *Alternaria sp.* became serious threat for early sown chickpea crop in and around Karnataka, India. It showed 100% mortality in experimental plots at Bangalore. Shedding of lower leaves and sparse poding are the most obvious symptoms of the disease. Initially, this disease has small irregular necrotised leaf spots and as the environment favours, these spots coalesce and thereby the leaf area with necrotised dark brown irregular spots develop throughout the leaf. Lesions on leaflets are water soaked, small circular and purple. These lesions are surrounded by chloratic tissues without definite margins. Lesions later turn brown to dark brown. When humidity is high they coalesce, cover the leaf area and cause rapid withering of individual leaflets. On the stems, the lesions are elongated and are brown to black.

On the pods the infections are circular slightly sunken and irregularly scattered. Affected parts turn dirty black.

Symptoms on stem and pods

On the mature pods, the lesions remain as localised, tiny, black superficial flecks. Seed is infected and shrivels. Under favourable weather conditions the entire foliage can die. However, correct identification of cause of this disease became difficult due to overlapping of symptoms of this disease with *Ascochyta* blight and *Collectotrichum* blight. Therefore it can be traced out by taking microscopic sections of infected parts of the plant.

Source: Muhammad Saifulla, Jayarame Gowda, Chandrashekara, K. Mudalagiriyappa, Nehru, S.D., Nagaraju, K., Manjunatha H. and Manjunatha, S.V., UAS, GKVK, Bangalore, India

Infestation of Pod Sucking Bugs in Mungbean, India

Heavy and unusual infestation of pod sucking bugs, *Clavigralla gibbosa* and *Riptortus Sp.* was recorded in mungbean in experimental plots at Regional Agricultural Research Station Lam, Guntur (AP) during the month of October, 2012 i.e., at the time of pod maturity and continued upto harvesting. Both nymphs and adults congregated in large numbers at the top of the plants, where pods were found in clusters and were observed to suck the sap from developing pods. The severity was high in mungbean as compared to urdbean, since the pods

Adults and nymphs sucking sap from pods

were available in clusters on the top plants in mungbean. Effected pods turned pale brown and hence the seeds got shriveled. In severe incidence, dropping of flowers and developing pods was also observed. Small white specks with cement like substance were found on the leaves underneath the effected inflorescences and pod clusters. Foliar application of either systemic or contact insecticide can control the pod sucking bugs effectively.

Source: M.S. MahaLakshmi, J. Sateesh Babu, M. Dinarayana, Y. Koteswara Rao, Regional Agricultural Research Station, Lam, Guntur (AP), India

Seminar

SAARC Agriculture Centre (SAC) organized a seminar on Agriculture & Food Security Challenges in South Asia on 11 July 2013 at BARC, Dhaka. Dr. Mruthyunjaya, former Director, National Centre for Agricultural Economics and Policy Research (NCAP), ICAR, India presented a paper on this topic. Dr. Wais Kabir, Executive Chairman of BARC presided over the seminar.

Consultative Meeting for Inception on Regional Initiative on Improvement of Pulses and Adaptive Trials in SAARC member countries

A two day consultation meeting for inception on "Regional Initiation on Improvement of Pulses and Adaptive Trials in SAARC Countries" organized by SAARC Agriculture Centre and Indian Council of Agricultural Research, New Delhi, India from 12-13 July 2013 at National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi. This meeting was organized as follow-up of the recommendations of the Regional SAARC Workshop held from 24-25 October 2011 in Kathmandu, Nepal.

Dr. S. Ayyappan, Secretary DARE and Director-General, ICAR inaugurated the meeting as Chief Guest. The participants were honoured by the august presence of Shri ArvindKaushal, Additional Secretary DARE and Secretary ICAR as Guest of Honour and the meeting was chaired by Prof. S.K. Datta, DDG (CS). Other participants included Dr. H.H. Fonseka, Chairman, SAARC Agriculture Centre (SAC) Governing Board, Dr. Ramesh Chand, Member, SAC GB, Ms. Nasrin Akter, Senior Programme Specialist(Horticulture) as well as Coordinator of the programme, SAC, Dhaka, Assistant Directors General from ICAR Drs. B.B. Singh, ADG (O&P), Gopal Krishanan, ADG (CC), J.S. Chauhan, ADG (Seed), A.K. Vasisht, ADG (PIM), Dr. N. Nadrajan, Director, IIPR, Kanpur, Dr. Narendar Kumar, Liaison Officer, ICRISAT, Dr. Ashutosh Sarker, ICARDA and delegates from Bhutan, India, Nepal, Pakistan and Sri Lanka and Mrs. Nasrin represented Bangladesh.

Chief Guest Dr. Ayyappan highlighted that the best practices in each country must be adopted for the betterment of livelihood of people and alleviation of poverty in the region. He stressed that pulses contribute to the soil fertility as well as human health thus leading towards sustainable agricultural development which is the mainstay of the region.

The Guest of Honour ShriKaushal expressed the view that 23% population of the world resides in SAARC countries while the contribution of agriculture to the GDP is only 3%. He emphasized that we must increase the contribution of agriculture to the GDP so as to achieve food and nutritional security through higher production of pulse crops in the region. He further narrated that climate change, trans-boundary animal and plant diseases are not restricted to a particular nation but transcend geography and pose formidable challenges which require strong regional cooperation. South Asian Association for Regional Cooperation provides a platform for the people of South Asia to work together in a spirit of friendship, trust and understanding.

A dozen of pulses are grown in this region but some major ones are common across the countries such as chickpea (Cicer arietinum), lentil (Lens culinaris), mungbean (Vigna radiata), blackgram (Vigna mungo), pea (Pisum sativum L.), Lathyrus (Lathyrus sativus L.),

As per the matrix (compatibility model) developed during workshop, lentil, blackgram and mungbean were found to be common in the South Asian Region and are the first research priority pulse crops in SAARC member countries for pulse production. Blight, Mungbean Yellow Mosaic Virus (MYMV), hairy caterpillar and rust diseases, low yield and germplasm variability 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

The mentioned pulses were chosen based on the regional workshop recommendation on the basis of their need and preference, for adaptive trials in the interested SAARC member countries. The workshop also agreed to exchange of technical expertise, genetic materials transfer, technical cooperation and technologies among SAARC countries. These three pulses were chosen especially targeting small/ marginal farmers of the Region. It was agreed to include more pulse crops in the future depending on the initial progress upon mutual consultation.

Objectives of the Pulse Adaptive Trial

- To identify integrated disease, insect and weed resistant cultivars of lentil, blackgram and mungbean
- Promotion of pulses with complete package of practices within each country through adaptive trial
- To identify high yielding varieties and germplasm
- Disease and insect management research in the SAARC region
- Collaborative trials to be conducted in each participating country
- Promising cultivars are selected from the trials and submitted to relevant national regulatory bodies of variety release by focal points of individual countries

- Sharing of successful technologies, knowledge and best practices among the region would help sustainable development of pulses.

The initiative would initially be for a period of three Years and depending on the progress and further interest of Member countries it may be further expanded and carried forward.

To discuss the modalities and practical aspects of the proposed network a consultative meeting was organized and participants representing six Regional countries namely, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka participated and following recommendations were adopted unanimously.

Recommendations

At the end of the two days consultative meeting, following recommendations were unanimously adopted by the delegation participating countries Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. List of participants is annexed (Annexure 1).

General Recommendations:

- SAC is accepted as coordinating organization
- Coordination at three levels viz, Regional, National and Local, is recommended
- Regional level: National Focal Person (NFP) Director /country nominee of National Pulse /Crops/Research Center/Institutes as indicated below are selected as NFP for the adaptive trails
- Bangladesh: Director, Pulses Research Centre, Bangladesh Agricultural Research Institute (BARI),
- Bhutan: Director, Department of Agriculture, Ministry of Agriculture and Forestry,
- India: Director, IIPR Kanpur
- Nepal: Program Director (Crops Development)
- Pakistan: National Coordinator (Pulse), NARC,
- Sri Lanka: Director, Field Crop Research and Development Institute
- National Level: Research Team Leader (RTL)
- Bangladesh: Chief Scientific Officer, Pulse Research Centre, BARI
- Bhutan: National Coordinator for pulses, RDC Bajo
- India: Coordinator (MULLaRP), IIPR, Kanpur
- Nepal: Coordinator, Grain Legume Research Programme, Rampur, Nepal Agricultural Research Council (NARC)
- Pakistan: Senior Scientific Officer, National Agricultural Research Centre
- Sri Lanka: Deputy Director Research (Pulses) Afghanistan and Maldives will be requested to indicate their interest in participation in the program and to nominate NFP and RTL accordingly.
- NFP will facilitate the implementation and RTL is responsible for execution of the program and submission of the reports to SAC
- Agreed to have 3 crops initially namely Lentil. Blackgram and Mungbean and depending on the future needs the program can be extended to other pulse crops.
- It has been agreed to share only pure line elite varieties.
- BARI will provide cold storage facilities to SAC for seed storage.

Recommendations on Adaptability Trials

- Each participating countries will conduct trials in defined cropping seasons
- There should be three (3) locations /Country and 3 Replications per trial and RCBD will be used as the experimental design. However first year there will be only one trial
- It is decided to have following population for each crop
  Lentil: 300 g/per location/entry
  Blackgram-250 g/per location/entry/
  Mungbean: 250 g/per location/entry/
- Cultural practices will be followed according to the national recommendations for respective crops. Participating countries will send their Seed materials of varieties to SAC, Dhaka by end of the August for Rabi and end of February for spring/summer. Seeds samples should accompany with germination reports. SAC is authorized to code/decode the varieties.
- The seeds provided during first year will be multiplied and maintained by the respective country for further trial during coming years.
- The seeds provided during first year will be multiplied and maintained by the respective country for further trial during coming years.
- Quantities of seed provided by each country will be as follows for conducting the multilocation trial in SAARC member countries
  Lentil: 2 kg seed/Variety
  Blackgram: 1.5 kg seeds/variety
  Mungbean: 1.5 kg seeds/variety
- SAC will provide observations to be made, standard data sheets and other recording material in consultation. These data sheets will be circulated to participating countries for finalization.
- NFP/RTL is jointly responsible for sending duly filled 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
- Signed MTA document of SAARC should be sent to the member countries

Recommendations on funding and other matters

- All trials will run initially by the respective NARS of the participating countries.
- Monitoring Team from SAARC member countries at least three/four experts will visit for monitoring the activities to be funded by SAC once a year.
- One nominee from each SAARC country may be invited for the participation at the training program.
- SAC will develop project proposal for future funding issues related to Materials Transfer Agreement (MTA) will be coordinated and facilitated by SAC.
- Annual review meeting 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.

Cluster Beans (Guar): An Industrial and Cash Crop

Cluster bean (Guar) [Cyamopsis tetragonoloba (L.) Taub] is a drought tolerant, summer annual legume, well adapted to arid and semi arid areas of the region. Although, guar is considered to be a minor crop, it has a larger role among the domesticated plants that supply the food and needs of human beings as it contains a high content of nutritional quality protein. Guar seed is the only commercially exploited source of gum. Guar seed consists of seed coat (14-17%), endosperm (35-42%) and germ (43-47%). On account of industrial value, guar seed has great demand from foreign countries like USA, Britain, France, Germany, Italy, UAE, Lesotho, South Africa, Hong Kong, China, Japan, Australia etc., and its market value is increasing day by day. World's most of the guar is grown in tropical deserts of Indo-Pak Sub Content. India produces 68% of guar, Pakistan 28% and only 4% is produced by the other countries (USA, South Africa, Sudan and Australia).

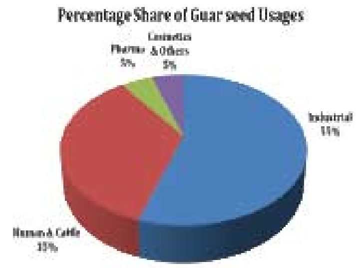
Uses of guar gum

Guar is a source of very valuable product called "Galactomannan" (guar gum, 25-35%) derived from its endosperm. Guar gum has diversified industrial applications, and is used everywhere and in every product e.g. food, pharmaceutical , textile industry, drugs, paper, cosmetic, tobacco, oil & gas well drilling, hydraulic fracturing, fish farming, poultry and cattle feed, paint, leather, fire fighting, explosive, beverages, confectionary, dairy products, baby pampers, photography, mining & construction etc. It is also used for vegetable, green manuring, guar meal and fodder purposes. It serves as a concentrate both for working and milch animals. Guar gum is mainly used as natural thickener, emulsifier, stabilizer, bonding agent, hydrocolloid, gelling agent, soil stabilizer, natural fiber, flocculants and fracturing agent etc.

Potential of the crop

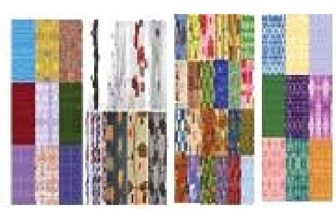
The yield of guar is very low as compared to its potential. The main reason is that this crop was treated as minor crop in past and the farmers had very little knowledge about the guar varieties and production technology of the crop. In addition, the existing long duration varieties of guar have lost their yield potential and also cause significant losses to the farmers in terms of late sowing of rabi crops (gram, raya and wheat). Therefore, there is a need to develop short duration varieties of guar having high yield potential and resistance to insect pests and diseases. In order to develop new varieties, genetic variability is a pre-requisite which is very low in existing available germplasm of guar. India has done comparatively more research on this crop and developed varieties having high yield potential. Likewise, Pakistan has also released varieties of high potential but it needs more improvement through increasing variability.

Keeping in view the importance of this crop as an industrial product to earn foreign exchange through export, this crop needs to be introduced in other countries of the SAARC region. Therefore, collaboration among SAARC research institutes in order to acquire guar germplasm is imperative to enhance the genetic variability which is a pre-requisite to develop new high yielding varieties of guar with desirable traits from genetically diverse material.



Area – Global Scenario (2012)

Food Products & Processing



Drug Industry

Textile Industry

Paper Industry

Oil, gas & water well drilling

Explosive use

Mining & Metallurgy

Tobacco Industry

Fish Farming

Cosmetics

Country Profile: Afghanistan

Agricultural Research and Extension priorities for development of Agriculture and Livelihoods of Afghanistan

Over 75% of the Afghan people live in rural areas where agriculture is the primary activity. Agriculture sector contributes about half of the GDP. A Farm Management Household Survey was conducted in 2012 by Ministry of Agriculture, Irrigation and Livestock (MAIL) of Afghanistan and Food and agriculture Organization of United Nations to know about the existing farming system in the country, farm productivity and constraints and potentials. FAO Consultant played a key role in survey of organization and implementation and conducting the farm management study. Some highlights of the results are presented here.

The survey was conducted in 7 provinces of Afghanistan - Kabul, Herat, Nangarhar, Parwan, Balkh, Kunduz and Bamyan. The selected provinces represent different types of farming system in Afghanistan. The farming systems identified in the selected provinces are (i) irrigated and rainfed cereals (wheat, rice, maize, barley); (ii) vegetables; (iii) fruits and nuts (grapes, apple, apricot, almond, etc); (iv) commercial crops (saffron, cotton) and (v) livestock and fisheries. The main cereal crops usually cultivated by the respondent households are wheat, rice, barley, corn and millet. The commercial crops cultivated are saffron, sugar beet, sugar cane, sunflower and soybean. The vegetable crops grown are potato, melon, tomato, egg plant, squash, green bean, broad bean, peeper and onion. The pulses grown are mung bean, lentil and chickpea. The tree crops based horticulture consists of fruits, specifically, apple, grape, apricot, peaches, pomegranate, walnuts, almonds, plums, quince, cherry and figs.

The mean age of the households in the 7 provinces was found to be almost similar (48-52 years). The mean education of the head of the household is about 7 school years. The average size of the households in the sample is 11. The average number of active labour force is 7.2 people per family. On the whole, the owner farmer is the most prominent farming group (65%), followed by the share-croppers (13%) and farming cum service (5%). It was found that 3% of the households are engaged both in farming and off-farm labor sale. Average landholding of the respondent households is 2.6 ha. On overall basis, per farm irrigated crops area was 1.57 ha and rainfed crops was 0.51 ha. The per farm land area for tree crops is found to be 0.21 ha. Across the 7 provinces there are considerable variations in land coverage in different cropping systems. Out of 5 cereals, wheat had the highest acreage (0.90 ha/farm) followed by paddy (0.22 ha/farm). The highest wheat acreage was found in Kunduz province (2.29 ha/farm) followed by Balk (1.09 ha/farm) and Herat (1.09 ha/farm).

The yield of irrigated wheat found to be highest in Herat (3,764 kg/ha) followed by Bamyan (3,066 kg/ha) in 2011. The average yield of irrigated wheat in all region was 2,846 kg/ha. Overall average yield of rainfed wheat was 935 kg/ha. It was highest in Nangarhar (1,152 kg/ha) followed by Herat (1,097 kg/ha). Yields of vegetable crops also varied significantly across provinces. The highest yield of melon was found in Balkh (15643 kg/ha) while highest yields of water melon, tomato, egg plant, cucumber, radish, okra, cabbage and cauliflower were found in Nangarhar as: 21,000 kg/ha, 23,971 kg/ha, 30,021 kg/ha and 27,383 kg/ha, 26,914 kg/ha, 19,354 kg/ha and 2985? kg/ha and 47,956 kg/ha, respectively. Nangarhar province was found to be one of the best vegetable growing provinces of Afghanistan.

The highest yield of apple was recorded in Parwan (17,342 kg/ha) followed by Kabul (11,956 kg/ha) and Herat (10,274 kg/ha). There were notable variations in yields of fruits and nuts. Overall, the average yields of apple, grape apricot, peaches and almond were 9,660 kg/ha, 19,908 kg/ha, 15,456 kg/ha, 18,100 kg/ha and 3,285 kg/ha, respectively.

The respondent farmers mostly used urea and DAP fertilizers for cultivation of cereal, vegetables, commercial crops, fruits and nuts. The doses of these two fertilizers used by the farmers varied significantly by crops and by provinces. In all regions, per ha use of urea and DAP fertilizer for irrigated wheat was 34 kg and 23 kg, respectively. Amount of urea and DAP fertilizers used for irrigated corn were 41 kg and 27 kg, respectively. In the case of irrigated rice amount of Urea and DAP fertilizer used were higher than that of wheat and corn. Per ha amount of urea and DAP fertilizers used for vegetable cultivation were 72 kg and 55 kg, respectively.

Irrigated wheat production was profitable with an average gross margin of $593/ha, net return of $413/ha and a Benefit Cost Ratio (BCR) of 1.71. Irrigated corn production was also found to be profitable with a gross margin of $593/ha, net return $413/ha and a Benefit Cost Ratio (BCR) of 1.70. However, gross margins, net returns and BCR of these crops greatly varied across provinces. It was found that cotton, which is cultivated in 5 sampled provinces, is profitable. The highest gross margin was in Kunduz ($814/ha) followed by Parwan ($687/ha) and Herat ($653/ha). Sugarbeat production is more profitable than cereals and cotton in that it yields average gross margin of $4,212/ha, net return $3,868/ha and BCR of 4.36. Also, saffron was found to be more profitable than cereals, and cotton with gross margin of $4,256/ha, net return $3,829/ha and BCR of 2.33. Potato production is more profitable than cereals and cotton as the farms received, on average, a gross margin of $1,616/ha, net return $1,435/ha and BCR of 2.65. It was found that egg plant is cultivated in the 6 provinces of the study area and it was profitable in all of the 6 provinces.

On average, egg plant had a gross margin of $3,004/ha, net return $2,824/ha and BCR of 3.67. Comparatively, egg plan and tomato had almost similar profitability and water melon was slightly less profitable.

Around 27% farmers reported that the participation in farmers' organization was highly beneficial; 25% reported it as beneficial and the rest reported as slightly beneficial. The main benefits mentioned were training and inputs. It was found that only 14% households have access to credit.

About 30% households in Nangarhar and 28% in Kunduz reported that the yield in their rice fields have increased during last five years. Overall, 39% farmers observed that their wheat yield has increased and 10% observed an increase in fruit yields in their orchard in last five years. Overall, the main reason for yield increase of rice was switch to High Yielding Variety (HYV) crops (41%) and fertilizer management (38%). Also the main reason for yield increase in wheat was switch to HYV crops (28%) and fertilizer use (32%). It was found that the respondent households improved farming operations during last five years. The highest changes were observed in the case of land preparation (39%), followed by irrigation (23%) and harvesting (15%) and threshing (14%).

In the light of the findings of the study the recommendations concerns:

- Wider dissemination of the results of the study for designing agricultural and extension programmes for development of Afghan agriculture and livelihoods.
- Development of irrigation and on-farm water management technology
- Technology development of High Value crops and low-cost farming systems
- Research and extension initiatives for development of cereal systems
- Technology adoption of integrated livestock development programme
- Promotion of farm business and market development
- Development of farmers' organization/cooperatives
- Design and conduct of Periodic Farm Management Household Surveys
- Expansion of scope and geographical coverage of Farm Management Household Survey

Source: Dr. S.M. Fakhrul Islam, Former International Consultant (Farm Management Economics), FAO, Afghanistan

BRRI Rice Variety Flourishes in Bhutan

Rice is the main food consumed in Bhutan, like other Asian countries. The crop is grown in the country in a wide range of ecology and elevation stretching from 200 – 2800 m. The current rice acreage is estimated to be around 23,844 ha, producing about 78,000 MT of paddy annually with an average productivity of 3.20 t/ha. Rice consumption in the country is high with an average per capita consumption of 145 kg per year. The total domestic production of rice barely meets half the national requirement, and the deficit is met through imports from India. The food production base of the country is small with less than 3% of the total area presently devoted to agriculture. Rice area is only about 5% of the cultivated land. One of the cherished goals of the Royal Government of Bhutan is to increase rice production and raise the level of food self-sufficiency. This can be achieved by using modern technologies including varieties in the existing land.

In the quest to acquire rice technologies, Bhutan sought collaboration with IRRI in 1984. The rice improvement program thus began in 1984 with Bhutan participating in the international rice evaluation nurseries (now INGER) program of IRRI. The main objective was to conduct a preliminary evaluation of elite breeding lines and varieties from rice improvement program of Asian countries under a wide range of irrigated and rainfed lowland rice environments. The focus of research was on identifying suitable varieties and appropriate management practices for rice. An elite breeding line from the Bangladesh Rice Research Institute (BRRI) with the designation BR153-2B-10-1-3 was introduced to Bhutan through IRRI in 1985. It heralded a new era in the history of rice research and development in Bhutan.

BR153-2B-10-1-3 was initially tested in Bhur research station located at 250 m elevation in the foot hills of southern Bhutan with a sub-tropical climate. As the line showed promise and phenotypic superiority at the station, it was evaluated in farmers' fields in all the low-altitude districts of Bhutan. The new line out- yielded local varieties by 29% under farmers' level of management (Table 1).

BR153-2B-10-1-3 did well both under irrigated and rainfed conditions. Based on the superior performance of the new line, the Variety Release Committee of the Ministry of Agriculture formally released it in 1989 as BR 153 for the low-altitude (<700 m) rice areas of Bhutan. The variety has white grain, 100-110 cm tall and matures in 140-145 days under Bhutanese conditions. The yield potential under moderate management ranges from 3-5 t/ha but responds well to added fertilizers. This variety is also suitable as a rainfed crop and has appreciable tolerance to water stress, poor soils, poor management and prevailing insect pests and diseases.

Variety	Sarpang (t/ha)	Samtse (t/ha)	S/jongkhar (t/ha)	Mean (t/ha)
BR 153	3.19	3.29	3.68	3.39
Local	2.39	2.47	3.00	2.62
Percent yield increase over locals				29

The sub-tropical low altitude rice accounts for about 35% of the national rice acreage. It is a high rainfall environment with higher temperatures. Diseases and insect-pests are more common. Soil conditions are poor (low N and K) compared to other zones. Rice is grown mainly as a rainfed crop due to lack of assured irrigation infrastructures. Yields are generally low compared to other zones. Moisture stress at flowering and post flowering stages considerably reduces yield. Despite such problems, BR 153 has flourished to become a favourite rice variety for the Bhutanese farmers.

The release of BR 153 has contributed significantly to boost rice production and household food security of Bhutanese farmers in the low altitudes. This variety is mainly grown and adopted in the three district of Bhutan and has stable grain yield for last twenty four years. According to an adoption survey done in 2010, BR 153 covers over 57% of the rice area in the Southern districts of Bhutan.

In light of the fact that Bhutan and Bangladesh share similar agro-environments, the Ministry of Agriculture and Forests of the Royal Government of Bhutan has signed a Memorandum of Understanding (MoU) with Bangladesh Agriculture Research Council (BARC) for exchange of agricultural technologies and technical expertise to the mutual benefit of both the countries. Such collaboration is expected to receive immense impetus for rice research and development in Bhutan. Some of the activities include exchange of rice germplasm and local capacity development of research and extension service provider of Bhutan by BRRI rice experts.

All queries relating to SAARC AgriNews be addressed to the Director

SAARC Agriculture Centre (SAC)

BARC Complex, Farmgate, Dhaka-1215
Bangladesh
Tel : 880-2-8115353, Fax : 880-2-9124596
E-mail : sac@saarcagri.org
Website : saarcagri.org