



# APAARI

## Newsletter

Asia-Pacific Association of Agricultural Research Institutions

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### Editorial

The Asia-Pacific region, with 55 per cent of world's population on less than one-fifth of global land and having 60 per cent of world's youth (750 million below 25 years) is agriculturally the most vibrant one. The poor enthusiasm of rural youth towards farming is mainly on account of lack of basic amenities, professional knowledge and inspirational pathways for their economic prosperity. Over time, the farming community in the region is getting poorer mainly due to small holdings, increasing risks due to overexploitation of natural resources, soaring fuel and input prices, volatile markets and growing concerns for climate change. Therefore, farming in the region necessitates a paradigm shift towards secondary and speciality agriculture, focussing on new innovations that can enhance the income of young farmers while ensuring natural resource management.

Successful business models of leading public and private sector organizations have clearly revealed that youth is more innovative, quite receptive and willing to take risk while adopting new technologies and innovations. On the contrary, aging farmers are often hesitant or rather slow in accepting new technologies. Also, there is a perception that traditional farming is non-remunerative and unattractive for our youth. Therefore, it is argued that 'business as usual' will not attract youth in agriculture.

Attracting young professionals in agriculture was recognized as an important challenge during the Global Conference organized by GFAR in 2006. This led to the birth of Young Professionals in Agricultural Research for Development (YPARD). Later, the Global Conference on Agricultural Research for Development (GCARD 2), organized at Punte del Este, Uruguay also reiterated the important role of youth in agriculture. Considering the growing unemployment and urbanization, leading to social disparity and unrest and affecting overall global food production, active involvement of youth in areas like secondary and speciality agriculture, rural entrepreneurship and specialized farm advisory services becomes very crucial. It is also evident that by linking science to society, specially through involvement of youth, will help ensure increased agricultural productivity for a food secure world. Transforming youth from 'Job Seekers' to 'Job Providers', would require a paradigm shift towards higher investments, enabling policies for empowerment of youth and their capacity development. The 'Way Forward' is obviously to make agriculture an economically attractive and respectable proposition.

As a follow-up of GCARD 2, the Asia-Pacific Association of Agricultural Research Institutions (APAARI) in collaboration with Indian Council of Agricultural Research (ICAR) jointly organized a national workshop on "Foresight and Future Pathways of Agricultural Research through Youth" at New Delhi on 1-2 March, 2013 and developed a Road Map to attract young professionals in agriculture. There are several youth led successful models in different countries for transforming agriculture. However, these models somehow lack appropriate mechanisms for regional and cross boarder exchanges for adoption. In view of this, a Regional Workshop on "Youth and Agriculture: Challenges and Opportunities" was organized jointly by APAARI and Pakistan Agricultural Research Council (PARC) in collaboration with CIMMYT, ICARDA, ICRISAT, Bioversity International and JIRCAS at Islamabad on 23-24 October, 2013. The workshop highlighted that the future of agriculture warrants impact oriented efforts at scale by involving youth to play a catalytic role in establishing 'Plough to Plate' chain. Future of agriculture in the Asia-Pacific, therefore, depends on greater involvement of youth through effective networking for knowledge sharing and outscaling of innovations. It is through their active involvement, we can move forward to make agriculture an agri-business oriented profession which is so crucial for the prosperity of our farming community.

*Editors*

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### Executive Committee

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	Ms. Esther Penunia
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Executive Secretary	: Dr. Raj Paroda

### Editorial Committee

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| • Dr. Raj Paroda | • R.D. Ghodake   |
| • P.S. Faylon    | • J.L. Karihaloo |



### APAARI Executive Committee Meeting

The meeting of the APAARI Executive Committee was held at the Hotel Best Western, Islamabad on 24 October, 2013 under the chairmanship of Dr. Simon Hearn. The meeting was attended by Executive Committee members and some special invitees. Dr. Masa Iwanaga, and Dr. S. Ayyappan were represented by Dr. T. Sugino and Dr. A.K. Srivastava, respectively. Dr. Ajit Maru, GFAR participated through Skype on behalf of Dr. Mark Holderness. Ms. Esther Penunia represented Asian Farmers Association (AFA) and Dr. Abdul Mazid represented Bangladesh Rural Advancement Committee (BRAC) on behalf of Dr. Mahaboob Hossain. Dr. Mahmoud Solh, DG, ICARDA and Dr. N.H. Son also attended the meeting as special invitees.

At the outset, Dr. Raj Paroda, welcomed Dr. Simon Hearn for chairing the meeting and all members of the Executive Committee and special invitees for their participation. Dr. Paroda expressed his appreciation to all APAARI members, FAO, GFAR, ACIAR, CoA, CG Centers and other stakeholders for their support in organizing various APAARI activities.

Dr. Simon Hearn, welcomed the members and special invitees and appreciated the remarkable progress made by APAARI. He highlighted that APAARI has successfully addressed these diverse challenges. He also appreciated the leadership role of Dr. Raj Paroda and hard work of APAARI Secretariat and emphasized that APAARI has made impressive progress and strengthened regional and inter-regional partnerships and also with Tropical Agricultural Platform (TAP) represented by Dr. Raghunath Ghodake, DG, NARI. The Chairman and Executive Secretary of APAARI are members of GFAR Steering Committee. APAARI is also represented in all Regional Fora, the CGIAR Fund Council and Evaluation and Impact Assessment Committee. He also stated that ACIAR is pleased with its partnership with APAARI and is expected to continue its support in future as well.

Dr. Raj Paroda presented a brief report on APAARI activities and the achievements. APAARI established collaboration with other Regional Fora such as AARINENA, FARA, SAARC, SPC, AFA and APIRAS. Seven conferences/expert consultations/workshops/ dialogues were held/planned in 2013. Eight publications have been brought out and three are in pipeline. APAARI and APCoAB websites are updated regularly and efforts are also on to develop the databases. He also presented the membership status, audited accounts and budget, status of fund investment and work plan for 2014 which were endorsed by Executive Committee.

Major decisions/action points are given below:

- It was agreed to organize the next General Assembly Meeting (GAM) of APAARI in Hanoi, Vietnam on 22 October, 2014. The Vietnam Academy of Agricultural Sciences (VAAS) has kindly agreed to host next GAM and provide support for local transport/conference facilities and other related expenses. Members desired that VAAS may consider providing support for local hospitality and accommodation for NARS leaders.
- APAARI Executive Committee meeting will be organized on 22 April, 2014 in Bangkok.
- Expert Consultation on Improving Maize Productivity in Asia is planned to be jointly organized by APAARI, VAAS and CIMMYT on 20-22 October, 2014 at Hanoi, Vietnam. VAAS will make efforts to approach some other organizations for sponsorship.
- National Workshops on Demand-driven AR4D Priorities will be organized in Southeast Asian Countries and also in Pakistan in collaboration with IFPRI.
- Other Expert Consultations/Workshops will be organized in the area of Biotechnology, GM Technology, Marker Assisted Selection, Biosecurity, and Open Access Journal Publishing.
- Expert Consultation on Food Safety will be organized in Japan in collaboration with JIRCAS in 2014 and Training on Food Safety is planned to be organized at ICRISAT, Patancheru, India.



*APAARI Executive Committee meeting in progress*

- APAARI was requested to join the celebrations of the International Year of AFA (2014) by co-organizing a meeting at the regional level through greater involvement of Farmers' Associations.
- It was mentioned that a government 'White Paper' on agricultural competitiveness is being prepared in Australia in which research and agricultural farm structures are likely to be examined. When the paper is completed in late 2014, this can be discussed with APAARI to assess regional implications.
- The members were requested to suggest some appropriate topics for the success stories, to be published by APAARI in the near future.
- It was agreed that the matter pertaining to the procedure for appointment of External Auditor can be discussed in the next GAM, if there are some suggestions.
- The sub-committee constituted for advising on fund investment could not meet and hence there is need to wait for recommendations on fund investment. However, the fixed deposit with the Siam Commercial Bank, Bangkok be retained as reserve fund to better avoid the risk involved with other investment options.
- Both Asian Farmers' Association (AFA) and Bangladesh Rural Advancement Committee (BRAC) have joined APAARI as reciprocal members. Hence, all present in the meeting decided to induct them as members of Executive Committee for the current biennium (2013-14). For an additional seat for private sector, it was decided to take a final view in the next meeting.
- The need was expressed for greater focus on small holder farmers, greater participation of stakeholders, transformative change in policies and collective actions, outcome based allocation, South-South collaboration and more effective collaboration with CGIAR Research Programs (CRPs).
- It was agreed to ensure harmony between APAARI biennium workplan and GFAR Medium-Term Plan (MTP) and take up additional programs as per additional resources made available by GFAR and other organizations. APAARI has already taken several initiatives concerning implementation of GCARD Road Map.
- With the involvement of APAARI in Tropical Agriculture Platform (TAP), the work load will increase. Moreover, TAP's objectives, role, etc. are not clear at this stage. Hence, APAARI should get involved only in those TAP related activities which fit well into its priorities.
- It was mentioned that the committee constituted for advising on legal status of APAARI has yet to explore the possible options. It was considered that suitable legal advice on options in Thailand would be useful.

Dr. Simon Hearn expressed his sincere thanks to all members and special invitees. He also thanked Dr. Raj Paroda, Executive Secretary for his valuable contributions and all other staff of APAARI for their sincere efforts in implementing various activities.

Dr. Raj Paroda thanked the Chair, all members and the special invitees. He thanked FAO, GFAR, ACIAR, COA, CG Centers and other partners for their support, Dr. Nguyen Van Bo for agreeing to host the next GAM in Vietnam, Dr. R.D. Ghodake for representing APAARI in TAP, and APAARI staff for their hard work and support.

## National Workshop on Outscaling Farm Innovation

A National Workshop on Outscaling Farm Innovation was organized on 3-5 September, 2013 at the National Agriculture Science Centre (NASC) Complex, New Delhi with the objectives to: i) discuss the farm innovations for their validation, refinement and dissemination, ii) help protect the interest of farmers through intellectual property rights (IPR) and benefit sharing, iii) promote inclusive market oriented development (IMOD), and iv) suggest policy and institutional measures for outscaling farm innovations.

The national workshop was jointly organized by Trust for Advancement of Agricultural Sciences (TAAS), Indian Council of Agricultural Research (ICAR) and Asia-Pacific Association of Agricultural Research Institutions (APAARI) and cosponsored by Global Forum on Agricultural Research (GFAR), Haryana Kisan Ayog (HKA), Bharat Krishak Samaj (BKS), Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) and National Rainfed Area Authority (NRAA).

In all, 272 participants comprising administrators, researchers, policy planners innovative farmers including women, civil society organizations (CSOs), non-government organizations (NGOs), farmer organizations and representatives of farming communities as well as private sector in India and representative of PROLINNOVA attended the workshop. An exhibition was also organized to showcase the potential of innovations for greater impact on small holder farmers.

The major recommendations emerged are as follows:

- A paradigm shift in AR4D is needed to address the needs of small farmers and place renewed emphasis on “Farmer First” through participatory approach, better knowledge sharing and enabling policy environment to ensure food security.
- Outscaling of innovations based on their techno – economic feasibility, relevance and utility would be the key for inclusive growth of small farmers. Identification of innovations and their faster adoption or use will benefit considerably the smallholder farmers, and hence needs urgent attention.
- Mission-mode programmes on small farm mechanization, protected cultivation, low cost rural based agro-processing for value addition, livestock development, promotion of hybrid technology, micro-irrigation, etc. would go a long way in increasing both productivity and income of farmers. Hence, greater policy support for promotion of these innovations will be needed.
- Farmer led innovations relating to new crops, new areas, new on-farm/off-farm based secondary agriculture, etc. must be identified, tested, refined and advocated for large scale adoption for greater benefit to our farming community.
- Integrated farming systems involving high value crops and livestock should be developed and encouraged for different agro-ecosystems. This would help in increasing income of small farmers.
- Market reforms should be given high priority for promoting farmer-led innovations. There is a need to revise Agricultural Produce Marketing Committee (APMC) Act especially to delink horticultural produce, provision of Kisan Bazars/Huts, cool chain and credit linked trade/marketing options, and linking farmers to markets.
- Convergence and connectivity of different institutions and development programs for outscaling of innovations and development of necessary social skills is necessary. The innovations in use of renewable sources of energy, like bioenergy and solar energy should be improvised and outscaled.
- Market innovations should ensure greater share of farmers in the value created, transparency in price discovery, better delivery of quality inputs, flow of market information and risk management.



*Inaugural Session in progress*

- There is a need for more effective and rather efficient extension mechanisms like information communication technology (ICT), smart phones, radio and television (dedicated channel exclusively on agriculture). Creation of a cadre of young technology agents for custom hire services in specialized areas will help in reducing dissemination losses while outscaling farm innovations.
- Incentives and rewards to innovative farmers will be needed to promote useful technologies on farmers' fields. For this, central and state governments must create “Farm Innovation Fund” so as to ensure their sustained interest in creating and promoting new initiatives for enhanced productivity and income.
- Incentives and venture capital funds should also be provided to the entrepreneurs for upscaling and outscaling farm innovations and technologies, which need substantial investment in producing material (planting material, machine, seed, feed, etc.) for outscaling the innovations.
- There is an urgent need for institutional reforms for better coordination, convergence and efficiency. Linkage between Krishi Vigyan Kendra (KVK) and Agriculture Technology Management Agency (ATMA), linking schemes under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), etc. with outscaling of useful farm innovations, will help in having greater impact of new innovations. Also, successful public-private-partnership models will need to be replicated by creating enabling policy environment.
- Innovative farmers, must be rewarded and given incentives as well as recognition as “Farm Professors”, so as to share their knowledge and experience, while imparting training to others. Farmer to farmer training will have much greater acceptability and generate confidence for outscaling new innovations.
- Availability of credit at low interest rates and provision of insurance schemes for promotion of activities by SGHs, cooperatives, farmers, companies, especially for processing, grading, storage and primary value addition will encourage small holder farmers in outscaling their innovations, since such provisions will reduce risk factor and build much needed self confidence to promote farm innovations.
- Farm innovations in livestock and other high value products are rather less documented and outscaled. There are many innovations relating to low cost medicinal and nutritional products in livestock sector. These need verification, improvement and outscaling.
- There is also need to provide adequate visibility to protection of farmers' innovations including varieties and sharing of benefits from their commercialization. Special programs must be supported to promote innovations in on-site conservation of genetic resources.

## NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia

A Regional Dialogue on Strengthening Partnership between National Agricultural Research Systems (NARS) and the Consultative Group on International Agricultural Research (CGIAR) Centres engaged in South Asia was organised jointly by Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the Pakistan Agricultural Research Council (PARC) on 22 October, 2013 at National Agricultural Research Centre, Islamabad. The dialogue mainly focussed on future priorities and the implementation strategies for strengthening partnership between NARS and CGIAR for shared vision in AR4D and for catalysing the policy makers/planners to create enabling environment to ensure food, nutrition and livelihood security in the region. About 100 participants, including 16 NARS Heads/their representatives, 4 CGIAR Director Generals/their representatives, policy makers and young agricultural professionals from NARS, CGIAR, NGO, the private sector and farmers' organisations had attended.

In view of the current constraints for agricultural sustainability and emerging new options like CGIAR Research Programs (CRPs) and the establishment of Borlaug Institute for South Asia (BISA), an interactive session was organised to define clear Road Map for strengthening AR4D partnership between NARS and CGIAR in the region. The senior experts deliberated at length the specific needs and chalked out possible future collaborations. The dialogue was structured to have an in-depth discussion on: i) past successes and future prospects for joint collaboration, ii) emerging challenges and opportunities in the region, and iii) needed policy reorientation for new partnerships.

The major recommendations emerged are as follows:

- The partnership between NARS and CGIAR Centers was an important cradle of 'Green Revolution' in the region. A similar partnership in future is needed now to address successfully the current and emerging challenges before agriculture. Since many of the challenges are highly complex, the new partnerships should be highly complementary and strategic in nature to harness their comparative advantages.
- The CGIAR change management process leading to strategic research framework (SRF) and the CRPs are designed mainly to build multi-stakeholder partnerships for focused, targeted and output oriented research. At the same time, it is felt that defined priorities of these CRPs are invariably not in line with those of the National Agricultural Research Systems. Hence, in order to overcome the existing mis-match, wherever exists, it would be desirable to have more detailed consultations with stakeholders in the region.
- The germplasm flow from CGIAR to NARS in the form of pre-breeding materials is expected to be the core strength of CGIAR. Hence, the germplasm flow should further be accelerated through multilateral/bilateral exchanges with NARS under ITPGRFA using the standard material transfer agreement (SMTA).
- There is an urgent need to increase investments (almost triple) for AR4D in South Asia, including the required funding for BISA. Unfortunately, policy support in this regard is lacking. Also, the donor community perception has to change to recognise the need for South Asia, being home for the maximum poor and malnourished people, even more than Sub-Saharan Africa (SSA).
- The region now needs Second Green Revolution, especially for much needed nutrition security. Hence, the focus of AR4D needs to be reoriented towards bridging the yield gaps, attaining diversified agriculture, outscaling innovations, ensuring resilience, sharing of knowledge and achieving inclusive market oriented development (IMOD).
- The establishment of Borlaug Institute for South Asia (BISA) provides an excellent opportunity in the region to carry out cutting edge research through multi-institutional, inter-disciplinary and multi-stakeholder partnerships. BISA could also focus on strategic research and promote cutting edge technologies that could reduce the cost on inputs on one hand and increase farm income on the other.



*Participants of Interactive Session*

- NARS-CGIAR partnership needs a non-linear approach wherein they jointly could play effective and more complementary role, including support both in cash and kind. CGIAR Centers should mainly target on new innovations, whereas NARS should assume major responsibility for their faster adoption on farmers fields for needed impact through process of refinement and validation.
- In view of scarce resources available with most of the countries in the region, it is extremely important that CG Centers work more closely with NARS to address specifically the priority areas while avoiding any duplication of work. Cross cutting areas like knowledge sharing and capacity development should once again receive priority attention of CG Centers.
- In order to make NARS-CGIAR partnership more effective and result oriented, similar interactive sessions/workshops need to be organized more frequently in future. In this regard, regional organizations like APAARI could play facilitator's role.
- In South Asian countries, existing administrative structure, lack of prioritization of research and development agenda, fragmentation along disciplinary lines, poor coordination, and volatile public funding are some real impediments, which need to be overcome soon through proper policy advocacy and public awareness mechanisms.
- There is an urgent need to build strong public-private partnership (PPP) through dynamic initiatives and required enabling environment. In this regard, greater trust, mutual understanding and defined roles/responsibilities right from the beginning will be needed. Clarity on access and benefit sharing will help in building mutual trust. Such initiatives may lead to higher investments in AR4D by the private sector.
- Partnership with agricultural universities in the region also needs to be built further to cater to the requirements of both research and education in specialized areas. There is also an urgent need for training the farmers, especially the youth, to adopt innovative approaches in different sectors of agriculture, beside crop production such as horticulture, livestock, fishery, agroforestry, etc.
- It is extremely important to involve both women and youth in agriculture. Their empowerment and participation in AR4D related activities, especially for secondary/speciality agriculture, extension services, processing/value addition and marketing will go a long way in ensuring future growth of agriculture in the region. It will also address the emerging concern of ageing population in agriculture. South Asian youth (including women), therefore, need specialized training and education to cater to the emerging needs in agriculture. In this regard, talents of young professionals be recognized and fully exploited. Also, they need to be encouraged to become entrepreneurs. In this context, it is expected that current CRPs, in partnership with NARS, will address this concern.
- CG Centers and the NARS will have to focus on better ways of communication. Hence, new mechanisms to share/transfer knowledge/technology more efficiently will have to be evolved for out scaling innovations at scale.
- CGIAR could also play an important role in policy advocacy for greater investments, strengthening agricultural R&D institutions for diversified agriculture in the region. Partnership between CG Centers and NARS will go a long way in addressing the Millennium Development Goals (MDGs) in South Asia, and hence needs to be strengthened.

## Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region

A Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region was organized jointly by Asia-Pacific Association of Agricultural Research Institutions (APAARI) and Pakistan Agricultural Research Council (PARC) at Best Western Hotel, Islamabad on 23-24 October, 2013. About 150 participants from different countries of Asia-Pacific region, CGIAR institutes, private sector, farmers and students attended. Out of these, more than 50 per cent participants were young professionals.

The Regional Workshop was organized with the objective to: i) assess national and regional constraints, opportunities and priorities for attracting youth (including young women) in agriculture to ensure food, nutrition and environmental security, ii) explore mechanisms for empowering farm youth through their involvement in decision making processes at local, national, regional and global level, iii) understand pathways to ensure effective participation of youth in agriculture through enabling policy environment, iv) develop suitable mechanisms for greater involvement of youth through various initiatives and collaborations, and v) create synergies and networks for capacity development, access to new knowledge and linking science to society by involving youth.

### Recommendations

As a result of in-depth discussions, the following major recommendations had emerged:

- Concerted efforts are needed at the national, regional and international level to reorient agriculture into Agricultural Research 4 Result (AR4R) by promoting agri-innovation, agri-business and entrepreneurship through involvement of youth.
- Agriculture must compete with other sectors of economy. Hence, there is an urgent need for greater involvement of youth in agriculture to address the emerging challenges and to achieve second green revolution this time for household nutrition security.
- To make agriculture intellectually interactive and rewarding for youth, special emphasis will be needed henceforth on secondary agriculture, diversification, protected cultivation, crop intensification, service providers and use of ICT in agriculture.

- The future challenges would require linking agriculture with health, environment, nutrition and other basic science disciplines so as to address effectively the challenges by young professionals.
- In order to attract youth in agriculture, we urgently need innovative approaches in developing and transferring technologies, efficient funding mechanisms, openness in knowledge sharing and much required marketing reforms.
- Focused attention on capacity development of youth, through vocational trainings, inclusion of agricultural education in school curriculum and farmers participatory approach for technology generation, transfer and adoption is currently needed to ensure faster growth in agriculture.
- Greater thrust is required to create synergies and regional networks for capacity development, access to new knowledge and linking science to society with human face through involvement of youth.
- It is high time that we involve youth in decision making processes both for research and development programs at the national, regional and global levels.
- Higher investments are needed to motivate young professionals to adopt agriculture as a profession, create more job opportunities in agriculture, and develop agriculture on lines of industry so that youth in future become 'job creators' and not 'job seekers'.
- Emphasis should now be on policy support for inter-institutional partnership as well as public-private partnership for attracting youth in agriculture
- There is also an urgent need for creating awareness amongst the youth, through the help of media, regarding emerging opportunities in agriculture.
- We now need strong political will and enabling policy environment for greater youth involvement in AR4D initiatives. For this, we need to focus more foresight, research partnership and capacity development.
- A regional network is urgently needed in the overall interest of future agricultural growth for sharing the knowledge, innovations, and expertise in similar target environments and socioeconomic settings. For this, international organizations like FAO, IFAD, WB, ADB, CG Centers and regional organizations like APARI, ASEAN, SARC need to devise appropriate mechanisms involving NARS of the region.



*Participants of Regional Workshop on Youth and Agriculture*

## Expert Consultation on Promotion of Medicinal and Aromatic Plants

The Asian region is very rich in the diversity of medicinal and aromatic plants (MAP). Any threats to these vital genetic resources will jeopardize the livelihood of millions of people. The significance of medicinal and aromatic plants has risen in recent years due to significant change in the life style and realization about negative impact of modern medicines and awareness for use of bio-safe products.

Considering these facts, the Food and Agriculture Organization's Regional Office for Asia and the Pacific (FAO RAP) and the Asia-Pacific Association of Agricultural Research Institutions (APAARI) jointly organized a Regional Expert Consultation on Promotion of Medicinal and Aromatic Plants in Asia and the Pacific at Bangkok, Thailand on 2-3 December, 2013 with an objective to: i) assess the current status of production, utilization and conservation of MAP in the Asia-Pacific region and identify future needs of conservation and opportunities for their development, ii) exchange information and share knowledge and technologies available in different countries in the region and learn from each other's experience; iii) create awareness on the value of MAP among producers in order to promote cultivation with a special focus to small scale farmers, iv) identify relevant policy options for strengthening the conservation and sustainable development of these



*Participants of the Expert Consultation on MAP*

resources, and v) strengthen regional collaboration and networking and develop a regional strategy for promotion and sustainable use of medicinal and aromatic plants.

In all, 40 delegates from 14 countries, namely, Bangladesh, Bhutan, India, Japan, Malaysia, Myanmar, Nepal, Papua New Guinea, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand and Viet Nam and representatives of FAO RAP and APAARI participated. Mr. Hiroyuki Konuma, Assistant Director General, FAO Regional Office, Bangkok inaugurated the expert consultation.

As a result of in-depth discussions, the following major recommendations emerged:

- There is an urgent need to prioritize the species (5-10) in each country that have high demand and comparative advantage for medicinal use. These need to be accorded high priority for research, general cultivation and value addition. Also, the rare and endangered species need to be identified for their proper evaluation and conservation. Also it will be highly desirable to develop a long term strategy for R&D concerning MAP by each of the National Agricultural Research Systems (NARS) in the region.

- The impact of herbal products invariably depends on their quality. Therefore, product quality management be given due attention right from the production of raw material to that of the finished product stage. Accordingly, adoption of good agricultural practices (GAP), good collection practices (GCP), good manufacturing practices (GMP), and good laboratory practices (GLP) need to be given high priority while promoting use of MAP. For this, it will be desirable if each country develops proper guidelines/monographs for good practices, including the requirement of labeling.
- Countries in the Asia-Pacific region have rich knowledge on MAP. Somehow, in most of the cases, this information is not scientifically documented/authenticated. Therefore, there is an urgent need to build a regional database covering: (a) list of medicinal plants being cultivated at commercial scale, (b) list of medicinal plants being collected from the wild, and (c) list of species on which countries in the region have valuable information but not well documented.
- The number of MAP being quite large in many countries, a strong R&D system would be required to be put in place. Hence, there is an urgent need to build strong institutional base so as to undertake systematic research work in different fields like ethnobotany (including molecular taxonomy, distribution and economic significance); genetic conservation, evaluation and improvement; agronomy; and post-harvest management and processing/value addition. Research efforts on medicinal plants for new drug discovery, especially for therapeutical use against various pharmacological targets would require strong institutional as well as funding support. State-of-the art bioactivity and biosafety screening techniques would also be needed to harness full benefits from MAP in the region.
- In order to create immediately the much needed infrastructure and R&D base, it was unanimously felt that the level of investment on MAP be tripled at each country level, supported by proper policy advocacy and general public awareness. Also, the required emphasis be given to build much needed competent human resource, which is currently lacking in many developing countries in the region.
- In the Asia-Pacific region, it was interesting to find that there are several MAP, which are common and for which there exists considerable traditional knowledge. Hence, the countries in the region could benefit immensely by sharing the knowledge, material and the production and processing technologies.
- There is an urgent need to develop a regional network on MAP for the Asia-Pacific region. Participants unanimously resolved that FAO Regional Office in Bangkok, with needed facilitation role of APAARI, may help initially to start this network and eventually pass on this responsibility to one of the willing NARS in the region. For this, all MAP growing countries be requested to join the Network formally.
- Linkage between research and industry is invariably lacking in most of the countries and hence, needs to be developed using successful models. For this, public private partnership for initiating research for development programs, through enabling environment and suitable policies, will be critical both at the national and regional levels.
- Regulatory mechanism for biosafety and international trade, including adherence to quality standards, will be important to link producers with consumers while ensuring Inclusive Market Oriented Development (IMOD).

## Asian Food and Agribusiness Conference 2013: Biotechnology and Global Competitiveness

The Asia Productivity Organization in collaboration with the Council of Agriculture, Taipei, China Productivity Center, and Food and Fertilizer Technology Center organized the Asian Food and Agribusiness Conference: Biotechnology and Global Competitiveness in Taipei on 15-18 July, 2013. Besides participation of Dr. J.L. Karihaloo, APCoAB Coordinator as a resource person, APCoAB sponsored participants from Sri Lanka and Thailand attended the conference.

The conference consisted of thematic sessions, open forums, panel discussions, poster exhibition, and a visit to the Bio Taiwan 2013 exhibition. Seventy four participants from 13 Asia-Pacific countries attended and shared their expertise through thematic presentations and discussions on biotechnology-related topics. APCoAB Coordinator delivered a talk on “Promoting Safe Application of Agricultural Biotechnology in Asia and the Pacific Region for Greater Global Competitiveness”, and chaired one session.

The important outcome of the conference was the widespread view among the experts and participants that biotechnology is one important tool to help Asia-Pacific countries to meet the challenges arising from climate change, natural resource constraints, food in security, and sustainable development. Additionally, experts shared experience in the many varied, proven, safe, effective applications of biotechnology ranging from biopesticides and biofertilizers to genetically modified crops.

### Recommendations

#### A. Policy/Regulatory Enablers

- Governments should put in place appropriate science based biosafety regulatory frameworks in line with international conventions. The regulatory process must be well defined with deadlines to ensure timely review and processing of applications.
- There is a need to synchronize international approvals, lower regulatory costs, and create favourable public awareness of the socioeconomic benefits of biotech products and services in order to accelerate acceptance by the public.
- Countries should learn from the experiences of those that have been successful in harnessing biotechnology through using cross-national metrics to benchmark progress and through the sharing of initiatives and experiences, whether successful or unsuccessful.
- To encourage biotech innovations and commercialization, governments should provide basic support such as financial incentives, a supportive policy environment, and infrastructure.

#### B. Risk Management and Risk Communication

- There are risks in starting and sustaining agricultural biotech enterprises. Specialized expertise is required to identify and manage such risks. A full understanding of these risks and the stakeholders concerned is needed with reference to the entire spectrum of biosafety regulatory and commercialization requirements for biotech products.
- There are still some concerns raised by the general public on the cultivation of biotech/GM crops. Experience has shown that it is important to treat all such concerns seriously. There is a need to address those concerns directly through appropriate communication strategies including the use of risk communication tools.
- One of the leading countries in Asia to approve a GM food crop for planting by farmers was the Philippines. Considerable expertise now is available in the national system within the Philippines. This experience should be tapped to conduct communication activities aimed at both internal and external stakeholders during R&D, product development, and commercialization. Such activities should



*The Conference in session*

be carefully designed to recognize stakeholders’ perceptions, build trust, and be flexible and effective even under high-risk situations.

#### C. Investment

- Many Asian countries have invested heavily in public-sector biotech R&D in anticipation of the growing demands to remain food secure. Biotechnology as a relatively new agricultural technology has seen high returns on investment. However, in order for the benefits of biotechnology to be realized fully, a key structural requirement is the existence of science-based biosafety regulatory frameworks and their operational implementation.
- Agriculture requires continuous innovations to keep up with the needs of the marketplace, farmers, and consumers. But, agricultural technologies require significant investments in funding and time, especially potentially “game-changing” technologies such as biotechnology. There is a great need to optimize and synergize, at the country level, biotech applications emanating from both the private and public sectors and to explore ways for both sectors to work toward expediting the delivery of biotech benefits to farmers and consumers.
- Many Asian countries face common challenges in meeting food and feed security needs. Biotech applications are the solution to address both challenges. A significant barrier to the use of biotechnology is the heavy investment required, especially by governments. Asian countries need to learn from one another and share experiences as well as coordinate efforts between governments, academic communities, local private companies, and foreign investors to offer a modality to accelerate the growth of the biotech sector.

#### D. Biotechnology for Green Productivity/Technology Solutions

- In view of declining water, energy, labour, and land resources “green food production” has become essential to grow more food to meet increasing demand. In the coming decades, countries will have to use biotechnology for green food production in order to deter food insecurity and to address the anticipated effects of climate change.
- Animal waste is a growing problem in Asia due to the increased demand for protein. Strategies to address biogas emissions such as biodesulfurization technology using bacterial biofilters as used in the Republic of China can be utilized to treat the large amounts of livestock biogas before it is used as clean energy in farming and other sectors.

#### E. Strategies for Sector Advances

- Non-GM biotech applications are much easier to commercialize and receive more public acceptance than GM biotech applications.

- Many non-GM biotech applications, such as biofertilizers, biopesticides, and tissue culture, are already accepted in Asian countries. Countries are urged to use the experience gained from public acceptance of such non-GM applications to support GM biotech applications.
- Biotech applications are varied, with a very broad scope, such as production inputs (biofertilizers, biopesticides, and animal vaccines), technologies (bioreactors, tissue culture, GM), and target crops and animals. Countries need to prioritize biotech applications appropriately to meet their needs, as has been done by the Republic of China, and provide adequate policy, financial, and logistical support to ensure success.
- Biotechnology has considerable potential to produce additional food from declining water and land resources while mitigating climate change impact, but its commercialization is constrained by unfounded perceptions of risk. International and regional organizations, NGOs, and agribiotech companies should continue to sensitize policymakers and planners to the potential contribution biotech applications can make to ensure national food security and socioeconomic development of the farming community.

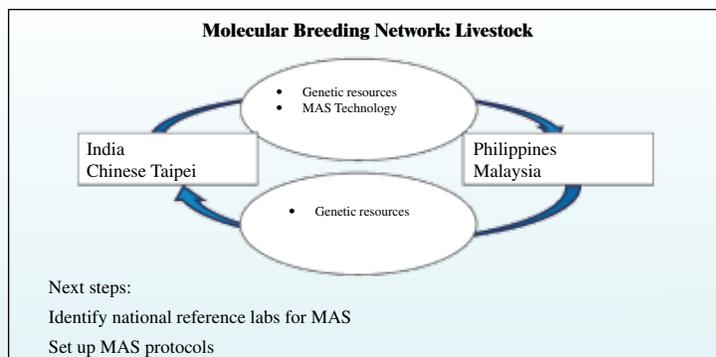
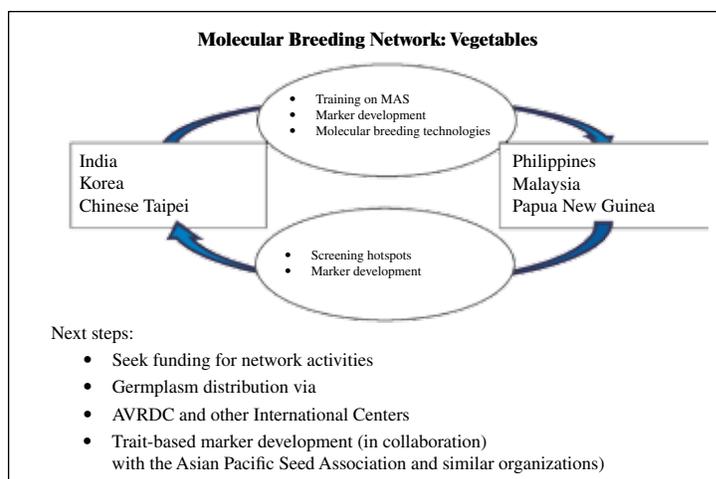
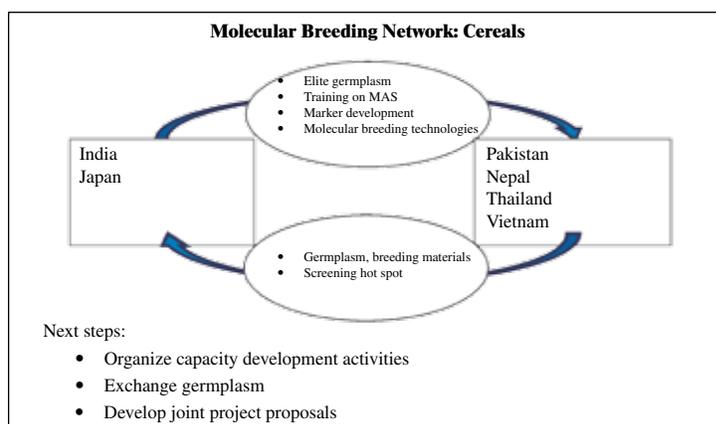
## Asia-Pacific Symposium on Molecular Breeding

APCoAB in collaboration with Council of Agriculture, Chinese Taipei and AVRDC - The World Vegetable Center organized “Asia-Pacific Symposium on Molecular Breeding” on 1-3 October, 2013 at AVRDC, Tainan, Chinese Taipei. It was aimed at promoting marker-assisted selection in crop and animal breeding in the region with the purpose to enhance food security and income generation along the whole agricultural value chain. More than 60 participants involved with plant and animal breeding from ten Asia-Pacific countries attended the symposium. APAARI nominated participants from Vietnam, Japan, Malaysia, South Korea, the Philippines, Thailand, Papua New Guinea, Nepal, Pakistan and India.



*Participants of the Symposium on Molecular Breeding*

The symposium program was divided into three parts: The first part provided a technical update on marker-assisted selection in breeding and on genotyping innovations. The second part reported on the status and the progress of molecular breeding in the countries represented in the symposium, which was followed by a networking session designed to connect people and build bridges between the research institutions in the region to enhance collaborations in marker-assisted selection in the region. The group discussions led to identification of three molecular breeding networks; cereals, vegetables, and livestock with identified network partners, commodities, work areas and work flow. Steps to formalize the partnerships and initiate network activities were also identified.



## Training Workshop on Open Access Publishing Using Open Journal Systems

A training workshop on 'Open Access Publishing Using Open Journal Systems' jointly organized by Food and Agriculture Organization's Regional Office for Asia and the Pacific (FAO RAP), Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the Global Forum on Agricultural Research (GFAR) with technical supports from the International Telecommunication Union (ITU) in Nonthaburi, Thailand on 26-30 August, 2013.

The objectives of the training workshop were to equip the professionals with skills needed to publish agricultural scientific research journals on Open Journal System platform; and to improve availability, accessibility, applicability and effective use of research results by wider agricultural community in most cost effective and efficient manner with the use of latest information and communication management systems.

A total of 13 participants attended the workshop which included 10 professionals who are involved in editorial/publishing of agricultural research journals from Bangladesh, Bhutan, Sri Lanka and Pakistan and three resources persons from Food and Agriculture Organization of the United Nations (FAO), International Crops Research Institute for the Semi-arid



*Participants of the Training Workshop*

Tropics (ICRISAT) and National Institute of Science Communication and Information Resources (CSIR-NISCAIR). Invited speakers from GFAR, ITU and other eminent information consultants were invited to share knowledge and experiences on Open Journal System (OJS).

*Continued on Page 15...*

## Profiles



### Asian Farmers' Association for Sustainable Rural Development

The Asian Farmers' Association for Sustainable Rural Development (AFA) is a regional alliance of national federations and organizations of small scale women and men farmers and producers. AFA was established in 2002 after a series of farmers' exchange visits (FEVs) organized by their strategic NGO partner, AsiaDHRRA (Asian Partnership for the Development of Human Resources in Rural Asia). In these five FEVs, conducted over three years, AFA recognized the great need to come, share, learn and act together towards their common desire for a better quality of life for themselves, the families, and the farming communities.

AFA invites national farmers' organizations as members and works with NGOs in facilitating the formation of national farmers' organizations and in continuously building their capacities. General Assembly is convened every two years and an Executive Committee meeting every semester.

### Vision

AFA envisions rural farming communities as: i) self-reliant, educated, happy, healthy, peaceful, and prosperous-free from hunger and poverty, ii) having access to and control over our lands, other basic productive resources, goods and services, iii) having access to fair markets for our products, iv) nurturing our farmlands via appropriate, integrated, and environment-friendly practices and technologies, and v) participating in development processes through politically strong, socially responsive, culturally sensitive and economically viable Farmer Organizations (FOs).

### Mission

AFA aims to be: i) a strong and influential voice of small-scale women and men farmers in Asia, ii) a strong lobby and advocacy group for farmers' rights and development, genuine agrarian reform, and mainstreaming sustainable agriculture in regional and national policies and programs, iii) a facilitator in the trading and marketing of our members' products, and iv) a platform for solidarity and exchange of information on agriculture and farmers' development for our members

### Peasant Agenda

AFA works to: i) promote sustainable agricultural policies and practices, ii) study and promote alternatives to economic globalization, iii) promote agriculture among the young', iv) promote fair and just treatment of smallscale women and men farmers, v) promote food sovereignty measures, vi) promote farmer-to-farmer market exchanges, vii) push for provisions on access to farm resources and rural development, and protection of small-scale women and men farmers' rights in Asian inter-governmental bodies (ASEAN, SAARC, etc.), viii) support environmentally-friendly adaptation and mitigation measures for climate change, and ix) strengthen AFA at the national and regional levels.

### Strategies (2011-2015)

By 2015, AFA will be the largest, most credible, transparent, trustworthy, and active organization of small scale women and men farmers in Asia working happily and harmoniously together towards the realization of our vision, mission and peasant agenda.

To achieve this, AFA will:

- Enhance networking activities and forge concrete partnerships with various organizations (e.g. other FOs, CSOs, GOs, NGOs, academe/research, business) in advocacy and other services to members (e.g. land tenure, agro-ecology, marketing and enterprise, women, gender equality, agri-health-nutrition-water-energy-food link, and youth).
- Make AFA an effective Knowledge and Learning Hub – capturing and sharing knowledge and lessons among FOs. We will document our stories, produce knowledge products such as manuals, case studies, videos, radio/TV programs as well as conduct study tours, farmers' exchange visits, learning and sharing sessions and farmer-to-farmer extension.
- Diversify funding sources via internal and external resource generation and effective secretariat management.

### Governance

Maintenance and upgrading of transparent, democratic, effective, efficient and sustainable organizational systems and processes for decision making and management.

*Source: Jun Virola, Asian Farmers Association for Sustainable Rural Development, afajun@asianfarmers.org*

## Bangladesh Rural Advancement Committee

Bangladesh Rural Advancement Committee (BRAC) is a development organization dedicated to alleviate poverty by empowering the poor, and helping them to bring positive changes in their lives by creating opportunities for the poor. It was established in 1972 in the newly sovereign Bangladesh, and over the course of its evolution, BRAC has turned into the largest development organization in the world. Organizing the poor using communities' own human and material resources, BRAC catalyzes lasting change, creating an ecosystem in which the poor have the chance to seize control of their own lives. BRAC has done this with a holistic development approach geared toward inclusion, using tools like microfinance, education, healthcare, legal services, community empowerment, social enterprises and BRAC University. Its work now touches the lives of an estimated 135 million people, with staff and BRAC-trained entrepreneurs numbering in the hundreds of thousands, a global movement bringing change to 11 countries in Asia, Africa and the Caribbean.



*Wasfia Nazreen, a goodwill ambassador of BRAC, on Adolescent Development Program (ADP) to retain the literacy rate and life skills for girls*

### Priorities

- **Focus on women:** BRAC places special emphasis on the social and financial empowerment of women. The vast majority of its microloans go to women, while a gender justice program addresses discrimination and exploitation.
- **Grassroots empowerment:** BRAC's legal rights, community empowerment and advocacy program organize the poor at the grassroots level, with 'barefoot lawyers' delivering legal services to the doorsteps of the poor.
- **Health and education:** BRAC provides healthcare and education to millions. There are 97,000 community health workers who offer doorstep deliveries of vital medicines and health services to their neighbors. BRAC also runs the world's largest private, secular education system, with 38,000 schools worldwide.
- **Empowering farmers:** Operating in eight countries, BRAC's agriculture program work with the governments to achieve and sustain food security. This is ensured by producing, distributing and marketing quality seeds at fair prices, conducting research to develop better varieties, offering credit support to poor farmers and using environmentally sustainable practices.
- **Inclusive financial services:** BRAC attempts to alleviate poverty by providing the services of its community empowerment program and targeting the ultra-poor program. Its cumulative disbursement is of almost 10 billion dollars in microloans annually, augmenting microfinance with additional services like livelihood and financial literacy training. Farmers get access to seasonal loans, high quality seeds and technical assistance. Millions now have the freedom to take control of their lives.

- **Self-sustaining solutions:** BRAC's enterprises and investments generate a financial surplus that is reinvested in various development program subjected to poverty alleviation.

### Strengths

- **"Thinking local, acting global":** Besides Bangladesh, BRAC spreads antipoverty solutions to 10 other developing countries, which are Uganda, Tanzania, Sierra Leone, South Sudan, Liberia, Haiti, Afghanistan, Pakistan, Sri Lanka and the Philippines. Today, BRAC reaches an estimated 135 million people with over 100,000 employees worldwide.

### The BRAC Family Today

- 97,000 community health promoters are providing essential healthcare worldwide, with maternal, neonatal and child health services covering 24.5 million in Bangladesh alone.
- 1.14 million children are currently enrolled in BRAC's 38,000 primary and pre-primary schools, and 9.51 million have graduated. BRAC's youth empowerment clubs provide life skills training to more than 260,000 teens from disadvantaged backgrounds.
- 5.54 million micro-borrowers with a cumulative loan disbursement of USD 9.73 billion.
- 25 million people have access to clean toilets thanks to BRAC's sanitation entrepreneurs.
- More than 600,000 rural poor women being organized through 11,234 PolliShomaj and 1,217 Union Shomaj; BRAC's 376 popular theater teams, in Bangladesh only, have reached nearly 4.3 million people.
- 101,222 human rights and legal education graduates and 19,252 local community leaders' workshop participants.

### Where BRAC works

The majority of BRAC's work is in Bangladesh. Its low cost, innovative solutions to the daily problems facing poor families has been scaled up to reach every village in Bangladesh. BRAC uses the microfinance groups as a social platform to deliver scaled-up services in health, business development and livelihood support. These are all critical components needed to ensure that poor people can break the cycle of poverty. Since 2002, BRAC has been using its experience to energize and accelerate poverty alleviation efforts in other countries. It has substantial operations in a growing number of Asian and African countries including Afghanistan, Pakistan, Philippines, Sri Lanka, Liberia, Sierra Leone, South Sudan, Tanzania, Uganda and Haiti. Besides, BRAC's Challenging the Frontiers of Poverty Reduction: Targeting the Ultra Poor (CFPR-TUP) program model was replicated in many countries such as Ethiopia, Honduras, Peru, Ghana, Yemen, India, Pakistan, Afghanistan and Haiti, and direct technical assistance was also provided.

Source: <http://www.brac.net>

### New Members of APAARI

Following organizations have recently joined APAARI as reciprocal members.

- Asian Farmers' Association (AFA)
- Bangladesh Rural Advisory Committee (BRAC)

In the last Executive Committee meeting, both AFA and BRAC have been inducted as members of the Executive Committee for the biennium 2013-2014 to represent farmers and NGOs, respectively.

*APAARI welcomes the new members*

**Chinese Taipei**

**Research Program to Improve Food Security under Climate Change**

Addressing the challenges of climate change and food security, the Council of Agriculture (CoA) launched an integrated research program on “Innovative Agricultural Research to Improve Food Security under Climate Change” in 2012. This 4-year research program is leveraging the expertise across different research disciplines and institutional mandates to identify and address the most important interactions, synergies and trade-offs between climate change and agriculture in improving food security for the country in the long run. Specifically, the program is to develop and integrate the innovative and promising approaches, practices, tools and technologies that can be mainstreamed into local agricultural production systems.

The six strategic themes of this research program include: i) create food security mechanisms responsive to climate change, ii) improve crop stress tolerance, iii) utilize environment-friendly cropping systems and indigenous vegetables, iv) establish high-yielding cropping systems to produce high quality forage crops, v) strengthen the agricultural production systems that are adaptable to climate change and resilient to extreme climatic events, and vi) develop low-carbon agricultural production technologies and alternative energy sources for agriculture

To review the progress of this research program, a 2-day review workshop was conducted at Taiwan Agricultural Research Institute, Taichung City, Taiwan on 28-29 October, 2013. The workshop brought together project researchers and stakeholders to look at the effectiveness and efficiency of the approaches, measures and/or technologies so far developed. Lively and candid discussions among all parties in this review workshop have provided needed information for accountability, and ascertained the caliber of research projects that meet the program’s objectives.



*AAALAC's on-site inspection of MIT mini pigs*



*Black son clown fish*

*Damsel fish*

*Powder blue tang*

certified by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC), three first published high-value ornamental marine fish species [black son clown fish, powder blue tang, and damsel fish (Fiji)], bottled Oncidium orchids, tea powder technology to produce low-cholesterol eggs, and transgenic fluorescent ornamental fish.



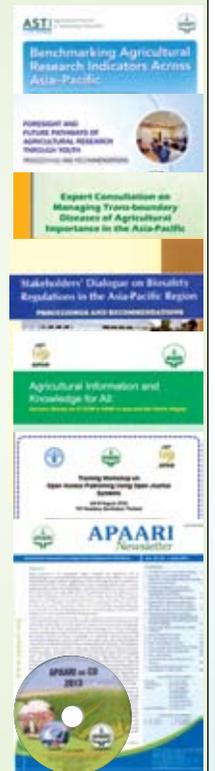
*Participants of the Review Workshop on Innovative Agricultural Research to Improve Food Security under Climate Change*

**Agricultural Technology Pavilion at Bio Taiwan 2013 Exhibition**

Bio Taiwan 2013, Taiwan’s largest annual biotech event, which was held in Taipei City on 17-21 July, 2013, has attracted about 1,200 exhibitors from Taiwan, USA, Japan, Australia, China, New Zealand, Switzerland, Singapore, etc. Among them are 83 cases displayed in the Agricultural Technology Pavilion set up by the Council of Agriculture (CoA). They are the outcomes of CoA’s efforts in the agricultural upstream-downstream research continuum. The pavilion features a wide spectrum of themes including orchid biotechnology, plant biotechnology, biopesticides and microbial fertilizers, herbal biotechnology, animal biotechnology, animal vaccines and diagnostic testing, aquaculture biotechnology, maritime ornamental fish, innovative plant varieties, and value-added agricultural utilization. Noteworthy highlights included Taiwan-produced mini pigs

**New APAARI Publications**

1. Benchmarking Agricultural Research Indicators Across Asia-Pacific : ASTI Regional Synthesis Report
2. Foresight and Future Pathways of Agricultural Research Through Youth : Proceedings and Recommendations
3. Expert Consultation on Managing Trans-boundary Diseases of Agricultural Importance in the Asia-Pacific – Proceedings and Recommendations
4. Stakeholders’ Dialogue on Biosafety Regulations in the Asia-Pacific Region – Proceedings and Recommendations
5. Agricultural Information and Knowledge for All: Success Stories on ICT/ICM in AR4D in Asia and the Pacific Region
6. Training Workshop on Open Access Publishing Using Open Journal Systems: Proceedings
7. APAARI Newsletter
8. APAARI on CD



## Developing Key Components of Plant Factory

A plant factory is an environmental control closed system for plant growth, in which constant production of plants is achieved all year around. The facility utilizes microcontroller units and computers for management of light, temperature, moisture/water, carbon dioxide concentrations, and nutrient supply through either automatic or manual activation. At present, plants grown in plant factory are mostly vegetables with few exceptions of flowers, ornamentals and fruit. By using high-tech plant factories, plants are produced in an industrial manner avoiding unpredictable weather elements. A plant factory can produce stable quantity and consistent quality of crop products year-round. With careful sanitary controls, there is no need to apply pesticides.

The research project entitled “Developing Key Elements of Plant Factory for Crop Production” is another highlight of this integral project. There are three research directions planned for this thematic



*High-performance three-dimensional modular shelving system using artificial light source for a re-circulating water culture method*



*Two mobile types of plant factory, a two-compartment model growing lettuce and mushroom simultaneously in the same container (left) and a simply equipped model growing one single crop as a store showcase (right)*

program. Firstly, several high-performance three-dimensional modular shelving systems are designed to grow crops which are moved automatically from one shelf (growth stage) to another shelf, as well as from one layer/track to the next layer/track, on the basis of pre-set developmental criteria. At the end of the rolling conveyor, mature plants are harvested. Large number of shelf modules can be connected to each other, according to the spatial limits or demands,

to set up the system of needs. Water or non-soil materials will replace soil as growth medium to improve efficient supply of nutrient recipe/solution, which will be recycled and reused through a series of processing procedures.

Secondly, environmental settings vary by plant developmental stages which are established so that plants are always grown in the optimal growing conditions in the plant factory. Practical know-how to accomplish a growth/production cycle will put together for a number of crops. Appropriate cultivation technologies for a wide range of crops will be programmed to fit to plant factory production. Accordingly, their corresponding environmental settings are built to create ‘climate-ready’ conditions for plant growth. To be more environmentally friendly, efforts will be made to equip these new facilities for tomorrow’s agriculture with renewable energy sources.

Lastly, in the initial phase of the program, vegetables that harvest vegetative tissues as final products are the top choices. Later on, research team will strive to produce reproductive organs (e.g. flowers) or functional chemicals (e.g. herbs). In addition to fixed type of plant factory by its long standing location, mobile type of systems that grow one single crop or mixed crops will also be explored. For example, in a two-compartment model that grows lettuce and mushroom simultaneously in the same container, mushrooms are grown as the companion plants of lettuce. High concentrations of carbon dioxide released in mushroom culturing compartment can be pumped into the next room for growing lettuce as source of ‘carbon fertilizer’. Such mobile type of plant factory can be moved from one place to another for purposes of exhibition, education, outreach, enjoyment, scientific study, etc.

In Chinese Taipei, this new way of facility farming is developing on the slow path. Due to high initial investments on hardware and software, and high energy costs, the majority of plant factories in operation are on a small scale. Nevertheless, with high economic value of certain crops and reduced carbon footprint associated with food transport, business opportunities for this new farming system are unlimited. In conjunction with techniques and knowledge databases developed from others, this thematic program will try to find resolutions for reducing manpower and energy inputs associated with plant factory operations.

*(Source: Tsao-kai Kuo, Specialist, Council of Agriculture, tkkuo@mail.coa.gov.tw)*

## India

### Zero Tillage Cultivation – A Viable Option for Large Scale Production of Rapeseed-Mustard in Rice Fallow

Water scarcity during post-monsoon seasons and lack of irrigation facilities, short time lag after rice harvest for seed sowing and high incidence of pests and diseases in late sown crops are the major constraints for oilseed cultivation in Manipur. As a result, only monocropping of rice is practiced and the farmers left their land fallow. The Directorate of Extension Education, Central Agricultural University, Imphal in collaboration with Directorate of Rapeseed-Mustard Research, Bharatpur implemented a project entitled, “Augmenting Rapeseed-Mustard Production of Tribal Farmers of North Eastern States for Sustainable Livelihood Security” under the Tribal Sub-Plan (TSP) in Imphal East District, Manipur during *rabi*, 2011.

Yield performance of rapeseed varieties, M-27, TS-36 and Ragini and mustard varieties, Pusa Agrani, Pusa Mahak, NRCHB-101 and NPJ-112



*Bee colonies for pollination*

were evaluated in 55 ha under zero tillage cultivation and compared with crops grown in 40 ha under conventional tillage. Besides no tillage (zero tillage) practice, use of four bee colonies/ha during crop bloom for pollination, spray of botanical pesticides without affecting pollinators population, and production of organic honey, were demonstrated. Since there was no rain throughout the crop period, the growth and yield parameters in all the rapeseed-mustard varieties were better in zero tillage than conventional tillage due to residual soil moisture after rice harvest. Among the rapeseed varieties, yellow *sarson*, Ragini gave the maximum average yield of 10.0 q/ha (range : 8.0 - 14.0 q/ha), whereas, NRCHB-101 among mustard varieties gave the maximum average yield of 10.2 q/ha (range :8.0-11.0 q/ha).

In all, 172 farmers across 9 villages of Imphal East District involved in the project improved their income by getting average net profit of Rs. 24,450/ha including cost of honey within three and half months with a low investment of Rs. 10,350/ha. By observing the standing crop in the field altogether, 1419 farmers across 50 villages in four districts of Manipur adopted this technology and the area coverage under zero tillage cultivation of rapeseed-mustard increased to 1010 ha during *rabi*, 2012.

Under the water stress situation where there was no rainfall during the crop period of *rabi*, 2012, M-27 among rapeseed varieties, YSH-401 among yellow *sarson* varieties and NRCHB-101 among mustard varieties gave the maximum average yield of 6.0 q/ha, 10.0 q/ha and 11.9 q/ha, respectively, under zero tillage cultivation.

The present success story in the farmers' field indicates that rapeseed-mustard is a climate resilient crop which can be grown without water in the residual soil moisture. By adopting zero tillage, the farmers could increase the productivity, reduced cost of cultivation thereby increasing the cropping intensity and earning an additional income for themselves with less effort. Zero tillage also helps in timely sowing (October-November), conserves soil moisture and requires less water, saves tillage cost and time and the soil is protected from erosion due to the retention of surface residues and reduce organic matter depletion.

The improved version of zero tillage cultivation with bee pollination and no chemical method of plant protection may be recommended to the resource poor farmers of the North Eastern Region.

*(Source: Prof. M. Premjit Singh, S.N. Puri, T.R. Singh, Th. R. Devi and Nandini Chongtham, Central Agricultural University, dee\_cau@yahoo.in)*

## Papua New Guinea

### National Biotechnology Centre Opens in PNG

The Papua New Guinea (PNG) National Agricultural Research Institute (NARI) has modest facilities at four locations around the country. The institute commissioned a modern National Biotechnology Center on the 27 June, 2013. This facility will now allow NARI to use some of the modern techniques and tools available. The facility houses two



*Staff in front of Biotechnology Center*

main laboratories, biotechnology and post-harvest. The function of the biotechnology laboratory is multifold. It will perform biological analyses such as crop genotyping using DNA markers (DNA fingerprinting), an application of polymerase chain reaction (PCR). Currently, NARI is one of the very few institutions that can perform PCR in PNG.

The biotechnology laboratory also serves as a focal point of capacity building in the forefront of molecular biology. PNG scientists trained overseas will now be able to apply their skills to solve country-specific agricultural problems. Our goal now is to train more scientists in order to keep up with the rapid advancement in biotechnology and adapt the technology in the country.

The post-harvest laboratory will address issues of storage, packaging, handling, transportation, processing and preservation. The facility is being fitted with necessary laboratory equipment, which will add to NARI's capacity to providing analytical and diagnostic services.

The laboratory will focus on improving quality and extending shelf-life of fresh produce, identify supply and value chains, determine losses in fresh produce, and develop field and laboratory curing techniques. It will also explore value-addition options to develop various products from locally grown foods.

The facility is known as Dr. Ghodake National Biotechnology Center, named after Director General, Dr. Raghunath Ghodake, in recognition of his dedicated and distinguished service to NARI and the agriculture sector in the country. Dr Ghodake has been instrumental in establishing, developing, nurturing, and leading the Institute over the last 16 years. Dr. Ghodake who has been the Director General since 2007 has made enormous contribution to innovative agriculture in PNG over the last 28 years, starting with the Department of Agriculture and Livestock and then NARI.

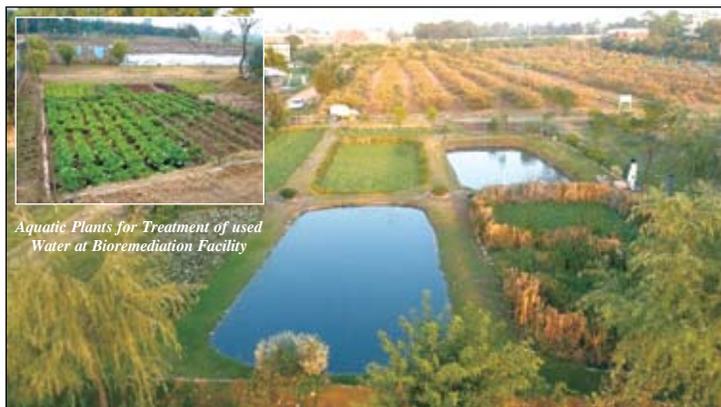
The facility funded by the government of PNG will be a central facility that will greatly enhance NARI's research for development capacity and provide support services to the agriculture and other sectors in the country. The centre would also be used by NARI's collaborators and partners locally and within the region.

*(Source: James Laraki, Sir Alkan Tololo Research Centre, NARI, PNG, james.laraki@nari.org.pg)*

## Pakistan

### Bioremediation Technology

Pakistan is facing water crises due to climate change, geo-political situation and non-adaptation of water conservation strategies. Water availability per capita per annum has been dropped from 1,299 m<sup>3</sup> in 1947 to 953 m<sup>3</sup> in 2012 which is estimated to further drop to 700 m<sup>3</sup> by 2025. If such situation persists, the food security and food safety will be threatened. To address the issue, different strategies and technologies need to be developed.



Aquatic Plants for Treatment of used Water at Bioremediation Facility

Bioremediation Garden, NARC, Islamabad

National Institute of Bioremediation (NIB) was established in 2009 with the objective to clean the used water, reclamation of contaminated soil through bioremediation which is a naturally occurring phenomenon in which different plant species and microbial consortia supported by a biological engineering component “constructed wetland” accumulate heavy metals, organic and inorganic compounds, toxic and hazardous substances from water and soil and reclaim them for reuse due to which the waste water becomes fit for irrigation. This phenomenon is known as bioremediation. NIB has vision to replicate the technology at national level, raising awareness to relevant stakeholders and capacity building to train the human resource.

Pakistan has diverse ecological zones where wide biodiversity exists. This biodiversity has been manipulated for reclamation of waste water through biological treatments which includes microbes, aquatic plants and constructed wetlands. NIB taxonomists and microbiologists have excellent expertise in collection, identification, characterization, and isolation of microbes and hydrophytes for biodegradation of all pollutants. Since 2009, NIB has developed this eco-friendly technology, validated and replicated it all over the country at more than 65 cities and reclaiming about 5 cusec of waste water. NIB has well versed team having competency in different areas of waste water and biological treatment i.e. taxonomist, biochemist, microbiologist, economist, soil & environmental specialist and other related areas of the waste water treatment and its reuse. NIB also established the integrated sanitation and farming system to maximize the use of treated waste water to make the technology economically viable. The team has excellent capabilities and expertise to replicate this technology in diverse agroclimates. It provides treatment of waste water in very cost-effective manner and also provides benefits in multiple ways i.e. high nutrient water for irrigation, less use of fresh water for irrigation, reduction in water borne diseases, and also consumption of less fertilizers.

Bioremediation seems viable and alternative natural technology that uses biological materials, plants and microbes for making waste water reusable. The technology is also very cost effective due to its use of indigenous resources, which makes it only 7 per cent of total cost, if waste water treated mechanically. Despite being cost-effective, it requires minimum

energy, and is doable, simple to apply, eco-friendly, globally accepted and generates income along with rehabilitating biodiversity.

Currently, NIB has planned to execute the multiple activities to fully utilize its potential. To generate awareness about bioremediation technology, NIB has introduced “NIB Bioremediation Forum” in partnership with different stakeholders from all over the Pakistan, NIB Bioremediation Kids Club to attract children, NIB Bioremediation “Cleaning the waste water – Greener the Pakistan” campaign, Promotional Vehicle, etc. to replicate the technology at micro or macro level, in housing societies, villages and on municipal and cosmopolitan level.

(Source: Muhammad Fiaz Joyia, Director/ Technical Staff Officer to DG, NARC, mfjoyia@yahoo.com)

### New Appointments



**Dr. Sergie Kopen Bang** has joined as the Director General, National Agriculture Research Institute (NARI), Papua New Guinea (PNG) on 9 December, 2013. Prior to this, Dr. Bang served as Deputy Director General and Director of Research at NARI. He also served on important positions as Leader, World Bank Project on Drought Response and CGIPT Projects, Project

Leader for South Asia Potato Research and Development under the Department of Agriculture and Livestock and also worked with Fresh Produce Development Company (FPDC).

Dr. Bang's major contributions include: i) development and release of potato fertilizer enriched with phosphate and boron for the PNG highlands, ii) developing recommendations on on-farm drought coping strategies for rural farming communities in PNG; iii) development of NARI gender mainstreaming policy, and iv) policy document on agriculture, forestry and climate change in the Pacific.

Dr. Bang is a horticulturist (crop physiology) by training having obtained his Ph.D. from the University of Western Australia. He graduated from the University of PNG in Agricultural Science with a first class honour's degree.



**Dr. Eskandar Zand** has joined as the Deputy Minister of Jihad-e-Agriculture and Head of Agricultural Research, Education and Extension Organization (AREEO), Iran. He served as Professor, Associate Professor and Assistant Professor at the Iranian Research Institute of Plant Protection, Iran. He graduated from Zanzan University in 1991 and obtained his M. Sc. (Agronomy) and Ph.D. (Crop Ecophysiology)

from Ferdowsi University of Mashhad, Iran in 1996 and 2000, respectively. He has 64 publications to his credit including books, research papers in referred scientific journals and papers presented in conferences/symposia. He also guided 15 Ph.D. students and 55 M.Sc. students.

*APAARI family wishes them a great success in their new assignments*

### CAPSA

#### Stronger Improved Skills, Sustained Agriculture

Reducing poverty and making agriculture in the Asia-Pacific Region sustainable fundamentally depends on capacities and skills of government and non-government agents, such as farmers, civil society organizations and the private sector. We all know that in the absence of strong capabilities to design and implement effective policies, the cost to society can be very high. This is particularly important today when the rapidly changing world food situation carries various risks and challenges especially for poor rural people.

But with the right investments in human development, policy makers can take more effective measures to mitigate these risks and researchers can continue developing innovations to help farmers cope with these challenges. Knowledge acquired through research as well as from experience of others, must be transferred to farmers in a practical and helpful way to address their problems and contribute to more sustainable farming systems.

Capacity building of individuals and institutions in the Asia-Pacific Region to better contribute to sustainable agriculture is at the heart of the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA), a subsidiary body of the Economic and Social Commission for Asia and the Pacific (ESCAP), based in Bogor, Indonesia. Whether it is policy makers, senior government officials, researchers or extension workers, CAPSA believes that enhancing their skills will lead to reduced poverty and enhanced food security of smallholders.

In 2013, CAPSA has major strides towards implementing a capacity building strategy for the region. The High Level Policy Dialogue on Technology Transfer for Smallholder Farmers, covered in the previous issue of the APAARI newsletter, kicked off a series of capacity-development programmes this year. In collaboration with various partners, workshops on topics such as policy analysis, technology and knowledge transfer, and research and development (R&D) have been organized.

To support the ESCAP member states in identifying policy priorities to achieve agricultural production targets that are environmentally sustainable and socially equitable, two policy analysis workshops took place in Bogor, Indonesia and Bangkok, Thailand. Both training workshops helped participating policymakers and researchers strengthen their understanding on challenges facing the global food and agricultural systems. At the same time, they enhanced participants' analytical capacity to carry out focused analyses to enable them to make informed policy decisions.

CAPSA is also leading the implementation of the Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia), a three-year project funded by the European Union (EU). Implemented in collaboration with partners, SATNET Asia facilitates knowledge transfer on best practices in sustainable agriculture and trade facilitation through a range of capacity-development activities. Below are some examples:

Targeting extension workers and others working with farmers, AVRDC – The World Vegetable Center has implemented a series of residential training programmes to enhance technical, scientific and managerial skills of participants on vegetable farming – from production to processing, marketing and consumption of nutritious vegetables.

Key national stakeholders from government agencies, research institutions and civil society have been trained in Myanmar and Afghanistan. The Myanmar training focused on sustainable vegetable crop production, and postharvest practices and marketing systems, while in Afghanistan participants were trained in integrated pest management and the application of biological methods of pest control to promote crop productivity and sustainability. At the regional level, experts in disaster risk reduction and climate change adaptation got together in New Delhi, India in June, 2013 to review ongoing efforts and strengthen their knowledge on climate-resilient farming practices for smallholders in South Asia.

To help overcome the bottlenecks that inhibit development of the market for farm products, training was also organized to build public and private stakeholders' capacities on 'electronic traceability' to facilitate trade in agricultural or food products.



*Trainees participating in field trip in Afghanistan*

CAPSA believes that enhanced processes for technology transfer are equally important as research and science itself. As such, workshops in Indonesia and Pakistan were organized to enable extension workers and researchers to identify sustainable technologies and recognize key findings in their work for dissemination to development practitioners.

Before the end of the year, more activities are scheduled to take place. An Expert Consultation on Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security was jointly organized by CAPSA and the Food and Agriculture Organization of the United Nations (FAO-RAP) on 11-12 December, 2013 in Bangkok, Thailand, with support from APAARI and the EU-funded SATNET. The consultation aimed to exchange experiences and agree on an Action Framework to improve research-extension systems in the region. Other technical training was also organized in Bhutan on cost-benefit analysis of agriculture technologies and on stress-tolerant rice in India.

CAPSA is committed to continue enhancing capacities to contribute to the region free of hunger and poverty. Its partnerships with other development players in this process are crucial to optimize research and development, promote best practices in sustainable agriculture, and strengthen knowledge and skills of its stakeholders.

*(Source: Martina Spisiakova, CAPSA, Indonesia; m.spisiakova @uncapsa.org).*

#### *Training Workshop on Open Access Publishing ...Continued from Page 9*

##### Recommendations

- There is an urgent need for capacity development of all those involved in editing/publishing a journal so as to manage and operate effectively the available open-source software in order to launch a new generation of journals committed to open access.
- It is necessary to promote and have advocacy at the institutional level to have a policy on open access journal and invest for improving accessibility, availability and effective use of available research outputs.
- It is important to ensure blind review system when sending articles to reviewers in order to avoid competitive harmful acts.
- Citation style of the American Psychological Association (APA) was recommended as a standard citation format for preparing the reference lists.
- Rather than recent online publication, there is a need to also bring out printed journals and have them digitized for enhancing accessibility of available knowledge.
- The minimum required standards to publish research results to international community are plagiarism threshold, scientific system design and interesting area of scientific research.
- Those who have inadequate information technology (IT) capacity are recommended to use web hosting services like ENAS to help maintain the online journals.

### IWMI

#### Smart Water Management Can Help Avert Climate-induced Food Shortages

Climate change will have a “profound” impact on water resources that could have serious knock-on effects for agriculture, according to a new report published this month.



Produced by scientists at the International Water Management Institute (IWMI), the report argues that while the exact impact of climate change on water resources requires ongoing research, the development of more resilient food production systems based on smarter water use is the most robust response.

“It’s quite simple: for the world to feed 9.6 billion people in 2050, it needs to significantly improve water management to produce more food, meet the increasing demands of other water users, and address the

challenges created by climate change,” said Peter McCornick, deputy director general for research at IWMI, and one of the lead authors of *Tackling Change: future-proofing water, agriculture and food security in an era of climate uncertainty*.

“The threat needs to be taken very seriously.”

#### Mounting pressure

With around 95 per cent of farmers in Sub-Saharan Africa already depending on often unreliable seasonal rains, and sharp declines in groundwater in parts of Asia largely due to demands from agriculture and competition from industry and cities, water shortages are likely to make food production in these areas increasingly precarious.

Now, projected rises in average temperature, more extreme weather, and changes in precipitation patterns are expected to exacerbate the problem, further affecting vast swaths of arable land. But, uncertainty over exactly what the effects will be, should not stall efforts to reduce the risks to farmers, the authors warn.

“What’s certain is that these changes, from climate and other factors, are not going to wait for us,” continued McCornick. “This means we have to be clear about our priorities and make significant investments in ‘no-regrets’ solutions for improving water storage and water access, and sustainably boosting farm productivity that make sense regardless of the impact of climate change.”

“If we’re not proactive, we’re very likely to see climate change intensify the stresses on our water resources, especially in many of the world’s poorest and most water-scarce countries. As well as threatening food production at the farm level, this could also cause lasting damage to complex ecosystems that currently support hundreds of millions of people.”

The report details a range of options for governments and communities to “future-proof” food production, which if combined, could significantly

improve the use of water in agriculture. These range from small-scale methods for storing rainwater on-farm and using it more efficiently, to large infrastructure investments, such as dam and reservoir construction. Underground water storage - to capture flood water - is highlighted as one promising new avenue of research.

It also stresses the need for more equitable access to water for women and marginalized groups to ensure they are not disproportionately burdened by the effects of climate change, and flags the need for improved institutional processes to ensure water management policies are implemented effectively.

“We’ve seen that we can enhance livelihoods and food security through a research agenda that explicitly links improved agricultural water management, food security, and climate change and that works to understand and reduce the vulnerabilities of farming households,” continued McCornick. “Now we need to re-double efforts to fine-tune and implement these solutions, to build the resilience of smallholders and the food production system as a whole.”

The report, which synthesizes years of IWMI research, was funded by CGIAR’s Climate Change, Agriculture and Food Security Research Program (CCAFS), a multi-million dollar, global effort to help smallholder farmers adapt to climate change. Funding was also provided by CGIAR’s Water, Land and Ecosystem Program (WLE). Publication coincides with the United Nations International Year of Water Cooperation, which aims to focus public attention on water issues worldwide. The report can be freely downloaded from [www.iwmi.org](http://www.iwmi.org)

#### Helping the media cover India’s water crisis

A new guide aimed at media practitioners, and published by the International Water Management Institute, attempts to bring the critical water issues facing India today into sharper focus.

The Last Drop? is designed to help journalists and producers give their readers, viewers and listeners a better understanding of the importance of water management issues in regional and national debates on food production, climate change, energy, poverty reduction and development.

The guide is made up of a folder of easy-to-use cards, each dealing with a specific water issue. These include climate change, groundwater and rivers. Key facts are listed along with a simple overview of the key issues. The Last Drop? was officially launched at the India Water Forum in New Delhi last October.

Copies are available at <http://www.iwmi.cgiar.org/regions/asia/south-asia-region/spotlight-on-india/media-guide/>

(Source: James Clarke, Director of Communication & Marketing, IWMI, Sri Lanka, [J.Clarke@cgiar.org](mailto:J.Clarke@cgiar.org))



## AVRDC

### AVRDC at 40: A Fresh Look Forward

AVRDC – The World Vegetable Center, the leading international institute for vegetable research and development, celebrated a four-decade journey to improve the livelihoods and health of millions.



*Taiwan Vice President Den-Yih Wu addressing an audience of distinguished guests at AVRDC's 40th Anniversary Celebration*

An international effort to support vegetable production in the tropics resulted in a 1971 agreement to establish the Asian Vegetable Research and Development Center (AVRDC). The Asian Development Bank and seven sponsoring countries, namely, Japan, Korea, Philippines, Taiwan, Thailand, Vietnam, and the USA dedicated the campus of the new institution on 116 hectares in Shanhua, southern Taiwan on 17 October, 1973.

Four decades later, scientists, diplomats, and policy makers from around the world gathered on 16-18 October, 2013 at AVRDC headquarters in Shanhua to mark the Center's 40th Anniversary. A ceremony on 16 October featured an address by Den-Yih Wu, Vice President of the Republic of China, who acknowledged the Center's role in benefitting the health and incomes of millions of small-scale farmers worldwide. Vanessa Yea-Ping Shih, Vice Minister, Ministry of Foreign Affairs, and Sing-Hwa Hu, Deputy Minister of the Council of Agriculture, noted AVRDC's influence on agricultural development in Taiwan.

### *Vegetables: the solution to malnutrition*

Although the institute's initial focus was on tropical Asia, the work of AVRDC today spans the globe. With regional bases in West and Central Africa, Eastern and Southern Africa, East and Southeast Asia, South Asia, West and Central Asia and Oceania, the Center's 44 international scientists and 300 national scientists and support staff aim to alleviate poverty and malnutrition through the increased production and consumption of nutritious, health-promoting vegetables.

"The world is making some progress on poverty reduction, but it is having less impact on the growing scourge of malnutrition," Dyno Keatinge, AVRDC Director General, said in his anniversary address. More than a billion people suffer from chronic malnutrition and hunger. For the first time in history, one third of the world's population is malnourished through imbalanced and excess consumption resulting in obesity, reduced life expectancy and increased incidence of diseases such as Type II diabetes. He noted that these contrasting states drive AVRDC's agricultural research and development to improve nutrition through use of vegetables were the most important source of the micronutrients, fiber, vitamins and minerals essential for a balanced and healthy diet.

### *Addressing the challenges ahead*

Low productivity, poor post-harvest handling, the urgent need for improved nutrition and other issues engaged a group of distinguished speakers to examine horticulture as a means to improve global food and nutritional security and drive social change during AVRDC @ 40: A 'Fresh' Look Forward, a two-day colloquium held on 17-18 October at AVRDC headquarters in Taiwan. Nobel Laureate Yuan Tseh Lee presented the colloquium's introductory paper entitled "Food Security in a Low Carbon Society" and stressed that human development need not mean environmental destruction if humankind "returns to the sun" by fully embracing the benefits of our most basic source of energy. The other important speakers were Jacqueline Hughes, AVRDC Deputy Director General – Research and Tony Simons, Director General of the World Agroforestry Center. Viewpoints from varied disciplines including agronomy, communications, economics, and government were shared and examined by panelists in three group discussions.

AVRDC maintains the world's largest public sector vegetable genebank, with a focus on hardy traditional vegetables important and wild relatives of common vegetables. The Center's improved varieties are planted on millions of hectares worldwide and its production technologies have made major improvements in smallholder incomes.

The Center fosters opportunities for increasing employment and incomes for small-scale farmers, landless laborers and communities. "Although our work of 40 years is by no means complete, it does represent a major step forward in bringing prosperity to the poor and health for all," Keatinge said.

### **Bringing Benefits to Bangladesh**

#### *Grafting gives women new options*

Pioneered by AVRDC and widely promoted for over 20 years by the Bangladesh Agricultural Research Institute (BARI), grafted tomatoes grown under plastic shelters during the summer rainy season have provided a very good income for many farmers. Demand for grafted seedlings is increasing as more tomato farmers face problems with bacterial wilt.

Mrs. Anjani Rani Das is the leader of five women in a self-help group (one of six such groups in Jessore and Barisal districts) that began growing grafted tomatoes using eggplant rootstocks provided by AVRDC. This year the group is planning to produce 5,000 grafted seedlings to fulfill local orders, in addition to 5,000 non-grafted seedlings. Grafted seedlings



*Dyno Keatinge and Shawkat Begum, USAID Project CIP discussing with the women's self-help group*

take a lot of effort to produce, but can be sold at 7 Takas each as compared to 1 Taka each for non-grafted seedlings. With training from AVRDC and the provision of simple seedling shelters, the grafted plants are providing a new source of income for the women and their families.

The scion is local tomato variety BARI Hybrid No.4, and the rootstock is open pollinated eggplant variety EG203 from AVRDC. Growing only half a dozen eggplants, and bagging the flowers to prevent cross-pollination, can ensure enough pure seed for next year's rootstocks.

Future AVRDC work in the district will involve trials to find tomato scions with better virus resistance, and testing of new lines for production under cover and in the open field.

### *Local innovations for better bitter gourd*

In Gaigut village, Jessore, Bangladesh, the fields are covered with vast horizontal trellises made of thousands of slender jute poles on which bitter gourd and snake gourd will train to grow. The area is a major production center for bitter gourd, and the unique trellis system is a local innovation developed by farmers to enhance the productivity of the crop and the quality of their produce.

AVRDC is implementing USAID-funded project with the International Potato Center (CIP) in southern Bangladesh to promote integrated crop management practices in vegetables, potato, and sweet potato.

Practices to control fruit fly in cucurbits were first introduced in Bangladesh by the Integrated Pest Management (IPM) Collaborative Research Support Program more than 15 years ago. With the commercial development of pheromone traps and other IPM supplies, thousands of farmers have been able to reduce their need for fruit-fly sprays by at least 75 per cent.

Successful IPM practices depend on local innovation and careful management. AVRDC's on-going partnership with BARI, CIP, local farmers and suppliers will be essential for greater adoption of improved vegetable production practices to benefit more farmers in Bangladesh.

*(Source: Maureen Mecozzi, Head, Communications and Information, AVRDC, Taiwan, maureen.mecozzi@worldveg.org)*

## ICARDA

### **The CGIAR Program on Dryland Systems Reduces Vulnerability and Boosts Agricultural Productivity in Dry Areas**

The CGIAR Research Program on Dryland Agricultural Production Systems embodies a new approach to an integrated agricultural research



*Youth face a daunting future in the dry areas*

## Prioritizing youth

The governments in most dry areas face rapid population growth, unprecedented rates of urbanization, high unemployment, youth-skewed age distributions, and the disenfranchisement of crucial groups, particularly youth.

The CGIAR Research Program on Dryland Systems addresses this by providing youth with essential and much-needed agricultural skills.

The Program will create employment opportunities for young people and retain them as an integral part of vibrant rural economies. It will also develop a monitoring and evaluation system that disaggregates the impact of innovations on marginal and vulnerable groups – including young people.

in the dry areas of five regions: Middle East and North Africa, Central Asia and the Caucasus, South Asia, East and southern Africa, West African Sahel and the dry Savannas.

The program works in cooperation with nine international institutions and regional partners in the target regions. It aims to develop resilient, diversified and more productive combinations of crop, livestock, rangeland, aquatic and agroforestry systems that increase productivity, reduce hunger and improve the lives of rural communities.

Dryland Systems engages in large-scale action research to identify innovative intervention packages-developed together with stakeholders - to sustainably improve agricultural productivity. The aim is to reduce the vulnerability of rural communities and entire regions across the world's dry areas.

To achieve this, the Program focuses on strengthening innovation systems, reducing vulnerability and managing risk, promoting sustainable intensification, developing market linkages, and conducting impact assessments and cross-regional syntheses.

Expected outcomes are:

- Improved crop and livestock productivity and reduced variability in agricultural production in target production systems
- New agribusiness and market opportunities and increased employment from the diversification of production systems and adding value to agricultural products
- Increased capacity of vulnerable smallholder farmers to adapt to climate change by adopting natural resource management options that improve the resilience of their livelihoods
- Equitable access to natural resources and better resources management.
- Innovation platforms: access to new knowledge for policy makers in target areas about agro-ecosystem development, or better focused investment in drylands.

The program will use innovation platforms to engage a range of stakeholders to understand what interventions work best where, and to encourage their adoption. The Dryland Systems approach is based on sound principles of the biophysical and socioeconomic sciences, development theory, and project management. This will create the right mix of partnerships, technologies, and policies to improve targeted dryland systems in major dry areas of the developing world.

*(Source: Dr. William Pyne, ICARDA, w.pyne@cgiar.org)*

## New Varieties Developed in Collaboration with NARS

### VL Jau 118: A new high yielding six-row barley variety for northern hills of India

VL Jau 118 (VLB 118) (IC 595247) is spring type barley (*Hordeum vulgare*) variety developed by VivekanandaParvatiya Krishi Anusandhan Sansthan (VPKAS), Almora, Uttarakhand and released by Central Sub-Committee on Crop Standards, Notification and Release of Variety, Govt of India in 2012.



*VL Jau 118: A new high yielding variety of six-row barley*

It originated from a line picked up during the field day, from the ICARDA nursery viz., 14th EMBSN planted at NBPGR, New Delhi in 2006-07 winter season. It is broadly adapted under rainfed timely sown conditions (15 October - 10 November) of Himachal Pradesh, Uttarakhand, Jammu and Kashmir hills and has performed well in comparison to all the checks, namely, BHS 352, UPB 1008 and HBL 113.

VL Jau 118 is spring barley with erect growth habit during early phase. Plants are semi-tall (75 cm). Its foliage color is light green. At the pre-physiological stage, the ear and peduncle color remains peculiar light green while the lower parts dry up indicating its stay green habit. At maturity, the ears become golden brown in colour and parallel in shape with intermediate density which tends to drooping. It flowers in 119 days and matures in 163 days. It has high test weight of 41 g and an average yield potential of 3,084 kg/ha. It is a 6-rowed hulled barley and has shown an overall significant yield superiority of 8.2 per cent over the latest 2 rowed hulled check UPB 1008 under rainfed timely sown conditions. VLB Jau 118 is also significantly superior by 33.2 per cent over 6-rowed hull less check BHS 352 and 10.7 per cent over 2 rowed hulled check HBL 113 under rainfed timely sown conditions. It has high degree of resistance against yellow rust under natural as well as artificial epiphytotic conditions

### A new high-yielding lentil boosts productivity in Bangladesh

Using genetic material from ICARDA, Bangladesh Institute of Nuclear Agriculture (BINA) has developed a new high-yielding, disease-resistant variety of lentil, 'Binamasur-7' which has yielded an average 2.3 t/ha – a significant increase over other locally available lentil varieties. It is also resistant to *Stemphylium* blight disease – a seed or stubble-borne disease that causes significant damage to lentil yields in Bangladesh. Binamasur-7 was first introduced to Bangladesh in 2007. After demonstrating initial disease resistance and high yield potential, the variety was subsequently evaluated for five years under preliminary, advanced, and regional yield trials across several locations:



*Dr. Snighda Roay (left) inspecting the performance of Binamasur-7*

Natore, Ishurdi, Magura, Faridpur, Rajshahi and Chapainawabgonj. Binamasur-7 seeds are now the subject of a massive national seed multiplication and dissemination program.

### VL 516: A new lentil variety released in India

Lentil is one of the major pulse crops, and ICARDA is working with VPKAS to develop high yielding and stress resistant varieties suitable for the region. VL-516 is a bold-seeded lentil variety developed from ICARDA-supplied genetic materials suitable for timely sown rainfed cultivation. This variety VL-516 has recently been released by VPKAS, Almora, Uttarakhand, India, an ICAR Institute, for cultivation in northern hills of India. A sizeable population of the people are vegetarian in this Himalayan mountain/hill range, and pulses are key source of plant protein for their nutritional security. Over the years, yield data from across locations showed that the variety outyielded all existing varieties, with 21 per cent yield gain. It is moderately resistant to wilt and rust diseases in All India Co-ordinated Testing Programme. The collaborative research between ICARDA and VPKAS has resulted in the development of three farmer-preferred lentil varieties including VL-516. It is expected that the joint efforts will help farmers to improve their farm income and provide house-hold nutritional security.



*Field view of VL 516 lentil variety*

### Lentil variety Markaz-09: A success story of lentil production in Pakistan

Lentil is second major winter pulse crop after chickpea in Pakistan. With the present production, the country cannot meet its domestic demand and > 50 per cent is imported from international market at the cost of hard-earned foreign currency. Although, nine improved varieties have been developed, their adoption was very limited. Markaz-09 was developed from a cross between ILL 7670 (ICARDA line used as parent) and PI 339283 (an exotic line). Uniqueness of the variety is that it has multiple desirable traits: high yield, drought tolerance, lodging resistance, bold-seed and attractive test a color (liked by farmers), quick cooking quality (liked by housewives) and high protein.

It gave an average yield of 1.8 tons/ha compared to 0.8 tons/ha by the best checks. The variety has a yield potential of 3.2 tons/ha. The variety is spreading very fast and occupied around 44% of lentil area covering five provinces in Pakistan. Farmers of Pakistan are now producing lentil variety Markaz-09 worth \$ 2.6 million annually and thus more availability of lentil in daily diet and reduced import substantially.



*Lentil variety Markaz-09*

(Source: Ashutosh Sarker, Regional Coordinator & Food Legume Breeder, ICARDA South Asia & China Regional Program, a.sarker@cgiar.org)

## Forthcoming Events

### Forthcoming APAARI Meetings/Workshops

- APAARI Executive Committee Meeting and APCoAB Steering Committee meeting will be held on 22 April, 2014 at Bangkok, Thailand.
- Expert Consultation on Improving Maize Productivity in Asia to be jointly organized by APAARI, VAAS and CIMMYT on 20-22 October, 2014 at Hanoi, Vietnam.
- APAARI General Assembly Meeting will be held on 22 October, 2014 at the Vietnam Academy of Agricultural Sciences (VAAS), Hanoi, Vietnam
- Expert Consultation on Food Safety, proposed to be held in collaboration with JIRCAS, in July, 2014 at Tsukuba, Japan.
- Training program on *in vitro* conservation and cryopreservation of plant germplasm in collaboration with Indian Council of Agricultural Research on 17-28 February 2014, at New Delhi, India.

### Forthcoming International Conferences/Events

- International Conference on Intelligent Agriculture 2014, 13-14 February, 2014, Hong Kong, China. For details, please visit <http://www.icoia.org/>
- Green Carbon Conference, 1-3 April, 2014 at Brussels, Belgium. For details, please visit [www.greencarbon-ca.eu](http://www.greencarbon-ca.eu)
- The IFPRI 2020 Conference on Building Resilience for Food and Nutrition Security will be held on 15-17 May, 2014 in Addis Ababa, Ethiopia. For details, please visit <http://www.2020resilience.ifpri.info/>
- Agriculture and Food 2014, 2nd International Conference, 5-9 June 2014, Elenite Holiday Village, Burgas, Bulgaria. For details, please visit <http://www.sciencebg.net/en/conferences/agriculture-and-food/>
- 4th International Conference on Asia Agriculture and Animal (ICAAA 2014), 9-10 June, 2014, Bangkok, Thailand. For details, please visit <http://www.icaaa.org/>
- International Conference on Agriculture and Forestry 2014, 10-11 June, Colombo, Sri Lanka. For details, please visit <http://agroconference.com/>
- 6th International Food Legumes Research Conference & 7th International Conference on Legume Genetics and Genomics, 7-11 July, 2014 at Saskatoon, Saskatchewan, Canada. For details, please visit <http://knowpulse2.usask.ca/ifrc-iclgg/>

### Dr. Raj Paroda Honoured

Dr. Raj Paroda, Executive Secretary, APAARI, Bangkok and Chairman, Haryana Farmers' Commission has been bestowed with the Silver Jubilee Commemoration Medal of the Indian National Science Academy for his significant contributions in the field of conservation and utilization of India's plant genetic resources for crop improvement. The medal is awarded to an eminent scientist once in three years for his outstanding contributions having an impact over a considerable length of time. While receiving the award from Dr. Krishan Lal, President, INSA on 27 December, 2013, Dr. Paroda also delivered a lecture on 'Addressing Emerging Challenges Before Indian Agriculture' to all INSA Fellows attending the Annual General Meeting at Sanjay Gandhi Institute of Medical Sciences, Lucknow



### APAARI Participation in other Fora/Meetings

#### Dr. Simon Hearn, Chairman, APAARI

- APAARI Executive Committee Meeting, 24 October, 2013, Islamabad, Pakistan
- NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia, 22 October, 2013, Islamabad, Pakistan
- Regional Workshop on Youth and Agriculture: Challenges and Opportunities, 23-24 October, 2013. Islamabad, Pakistan
- The 10th CGIAR Fund Council Meeting in Nairobi, Kenya, 6-7 November, 2013

#### Dr. Raj Paroda, Executive Secretary, APAARI

- National Workshop on Outscaling Farm Innovation, 3-5 September, 2013, New Delhi, India
- NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia, 22 October, 2013, Islamabad, Pakistan
- Regional Workshop on Youth and Agriculture: Challenges and Opportunities, 23-24 October, 2013. Islamabad, Pakistan
- APAARI Executive Committee Meeting, 24 October, 2013, Islamabad, Pakistan
- Expert Consultation on Promotion of Medicinal and Aromatic Plants in the Asia-Pacific Region, 2-3 December, 2013, Bangkok, Thailand
- Expert Consultation on Strengthening Linkages between Research and Extension, 11-12 December, 2013, Bangkok, Thailand.

#### Dr. J. L. Karihaloo, Coordinator, APCoAB

- Application of genetic engineering in grain legumes and its translation, 18-27 November, 2013, Hyderabad, India.

#### Dr. Bhag Mal, Consultant, APAARI

- National Workshop on Outscaling Farm Innovation, 3-5 September, 2013, New Delhi, India
- NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia, 22 October, 2013, Islamabad, Pakistan
- Regional Workshop on Youth and Agriculture: Challenges and Opportunities, 23-24 October, 2013. Islamabad, Pakistan
- APAARI Executive Committee Meeting, 24 October, 2013, Islamabad, Pakistan
- Expert Consultation on Promotion of Medicinal and Aromatic Plants in the Asia-Pacific Region, 2-3 December, Bangkok, Thailand

#### Dr. Raghunath Ghodake, Director General, NARI, PNG

- Tropical Agriculture Platform (TAP) Inception Workshop, 4-6 September, 2013, Hainan, People's Republic of China

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