India-ASEAN News on Agriculture and Forestry

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News Updates

Message

Sharad Pawar

AGRICULTURE in India plays a vital role, and for the people of rural India, it is a way of life, is a tradition, which for the centuries, has shaped their thought, their outlook, their culture and their economic life. It is the backbone of the livelihood security system in India, where more than two-thirds of the population lives in villages. So, agriculture is not just a question of economics and trade but of dignity and of survival.

Attaining food self-sufficiency and food and nutritional security had been a challenge before us since independence. We all look back proudly to our green revolution, which helped us to overcome our food shortages and banished specter of starvation or living from ship- to- mouth. We are now looking forward for a second green revolution that is more broad-based, more inclusive and is sustainable also.

Land and water are very precious resources of agriculture, and their optimal use is very important. More than 100 million hectares of our potentially productive land is facing various forms of degradation for which necessary technological interventions would be required. Overuse and inappropriate use of chemical fertilizers is affecting the quality of our soil. Water, both in terms of quality and quantity, is now a serious constraint for agriculture in most parts of the country. Hence, adequate care needs to be taken to develop and scientifically manage irrigation resources. It would be worthwhile to give high priority to "more crop per drop" approach, rainwater harvesting, aquifer recharge, revival of water-bodies and conservation technologies.

Rainfed agriculture continues to play a very important role in our economy, contributing about 60% of the cropped area and 45% of the total agricultural produce. The anticipated second green revolution has to explicitly embrace farming in rainfed areas. Though many new technologies have been developed for our rainfed regions, yield gaps still continue to be very large. Our irrigation efficiency is estimated to be around 30%. Pace of development of resource conservation technologies that would improve input-use efficiency, and conserve and protect our natural resources need to be accelerated.

The emerging problems that our farmers face are related to intra-seasonal variability of rainfall, extreme events and unseasonal rains due to climate change. These aberrations cause heavy losses to crops every year. There is, therefore, an urgent need to speed up our efforts to evolve climate-resilient crop varieties, cropping patterns and management practices. India has its strengths in genomics, capacity-building, Human Resource Development, trans-boundary disease monitoring and management, and managing biodiversity of crops.

Our past efforts have made us achieve 4 times jump in foodgrains production, 6 times in horticultural crops, 6 times in milk, 9 times in fisheries (marine 5 times and inland 17 times) and 27 times in eggs production since 1950-51, thus making it one of the most remarkable achievements in the history of India.

For the economy of India, agriculture is critical, and so is with most of the ASEAN member-countries. Sustainable agriculture and forestry based on the principles of the enhanced productivity, profitability, environmental and human safety remains at the core of the development. I believe that with the enormous wealth of natural resources and expertise available in the region, cooperation in the agricultural and forestry sectors between India and ASEAN member-countries can play a major and a significant role in the development and integration process of the region. With a view for ensuring all-round development, I feel that there is a tremendous scope for cooperation in the areas of promoting high- value crops, improved cropping systems, integrated management of nutrients and pests, post-harvest processing and value- addition of crop produce. I hope this newsletter will provide a strong interactive platform for mutual benefit of the ASEAN member-countries and India.

SHARAD PAWAR
Minister of Agriculture and
Food Processing Industries
Government of India

Message

HE Suswono

RURAL poverty and unemployment are the two most critical issues, Indonesia is facing right now. Also the issue of the Food Security is to be addressed with the same degree of consideration. With a population of 238 million people, half of which is living in the rural areas, Indonesia is the 4th most populous country in the world, after China, India and the United States. It is world's 15th largest country with an area of 1.9 million km^2, and its marine area is around 3.1 million km^2. Its GDP in 2010 at the purchasing power parity (PPP) was USD 1,030 billion; 16th largest of the world. Indonesia's GDP per capita of USD 4, 300 at the PPP ranks it in the lower middle-income country.

With more than 17,000 islands, 6,000 of which are inhabited; Indonesia is a strongly heterogeneous country in terms of the population density, land and water resources, climate and infrastructure. On an average, Indonesia is scarce in agricultural land, at just 0.23 ha per capita; representing one-third of the world's average area, similar to Italy and Germany, and lower than China and higher than India. But it has relatively abundant renewable water resources at 8.5 thousand m^3/capita/year; slightly lesser than the United States, but four times more than China, and eight times more than India.

Although the contribution of the agriculture to the GDP of the country has fallen from 19% in 1990 to 15% in 2010 and its share in the total employment from 56% to 38% over the same period; agriculture still continues to provide employment to about 42 million people. Improvement in labour productivity has increased roughly at the same pace as the total production; with the result total employment in agriculture remains relatively stable in the country. In the countries with strongest growth in the labour productivity, such as China and India, employment through this sector has fallen. This is not yet the case in Indonesia.

Agriculture is dominated by the abundant labour in comparison to the available agricultural land, resulting in small-scale production. Food-crop production, in particular, is small farm-based with a little mechanization, with average irrigated area ranging from 0.3 ha in Java to 1.4 ha off-Java. While smallholders are important suppliers of the perennial crops; there are large private and state owned farms, operating mainly in Kalimantan and Sumatra, specialized in perennial crops, particularly palm-oil and rubber, their average size is around 2,600 ha; occupying about 15% of the total crop area. If these farms are taken into consideration, overall estimated average farm size of the country is about 2 ha.

With an average value of agricultural production at the USD 66 billion in 2007-09, Indonesia is world's 10th largest agricultural producer, following Turkey and France, and is ahead of Germany and Argentina. It is world's most important palm-oil producer, the second largest natural rubber producer, after Thailand, and the third largest rice producer, after China and India.

Based on the above, there are some opportunities for collaboration between Indonesia and India in agriculture and forestry development in the future. We need to realize some of them that we discussed in our Working Group meeting in Palembang. I hope that through the publishing of this newsletter, we will gain knowledge about the agricultural developments in the member-countries of the Working Group.

SUSWONO
Minister of Agriculture
Indonesia

Wasan Vocational School, SVW
Brunei Darussalam

The SVW strives to prepare students, who will be ready for the new global economy

Wasan Vocational School (SVW) was established in 2005, and since then it is in the limelight of the whole nation as the sole provider of the agricultural training programmes at the diploma and certificate levels.

On 8 May 2012, SVW was selected by the Ministry of Education to become the first and pioneering Model School for Brunei's vocational and technical education.

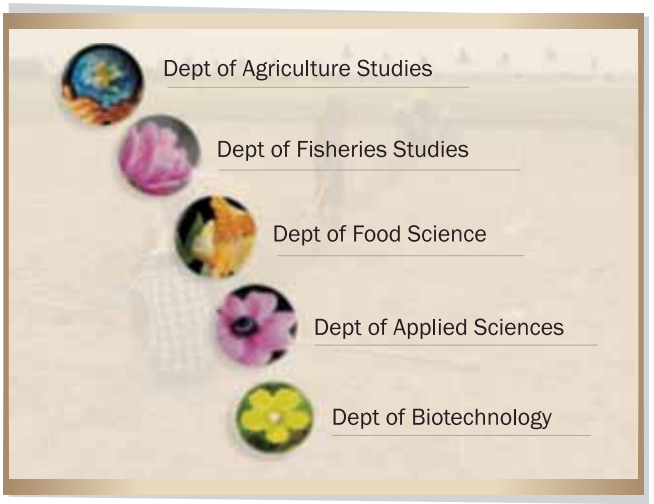
technology, applied sciences and biotechnology.

The establishment of the SVW as a model school is a mission and a long-term investment of the Government to initiate autonomy, accountability, culture change, community partnership and capacity-building in schools that would act as a catalyst in enhancing implementation of the new **Bruneian 21st Century Education System, SPN-21**.

2012

The SVW currently runs nine different training programmes at both Diploma and Skills Certificate Levels

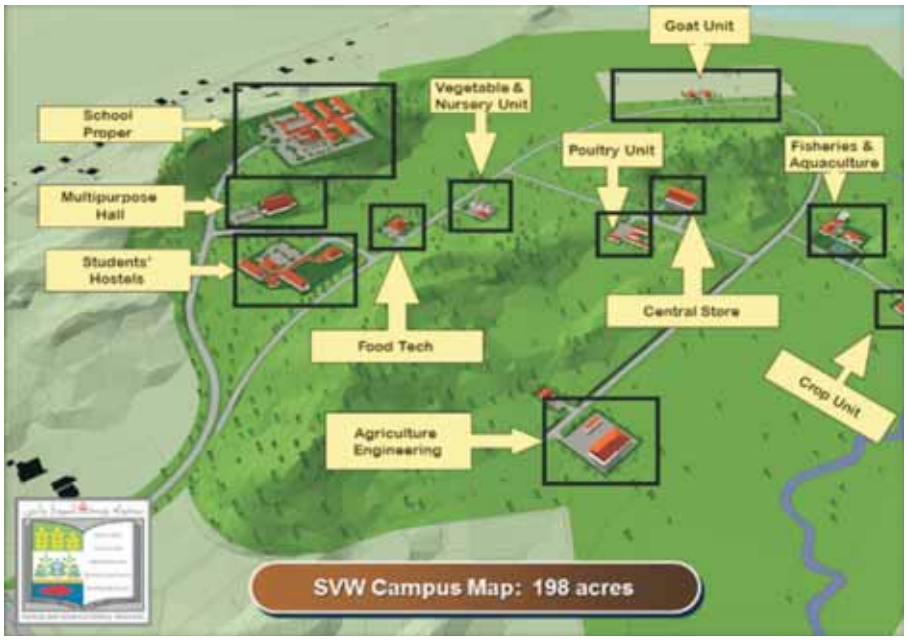
1. Diploma in Agriculture Science
2. Diploma in Aquaculture & Fisheries
3. Diploma in Food Science & Technology
4. Diploma in Science
5. Diploma in Biotechnology
6. Diploma in Pharmacy Technician
7. Skills Certificate 2 in Crop Production
8. Skills Certificate 2 in Fish Husbandry
9. Skills Certificate 2 in Food Processing



Training departments at the SVW

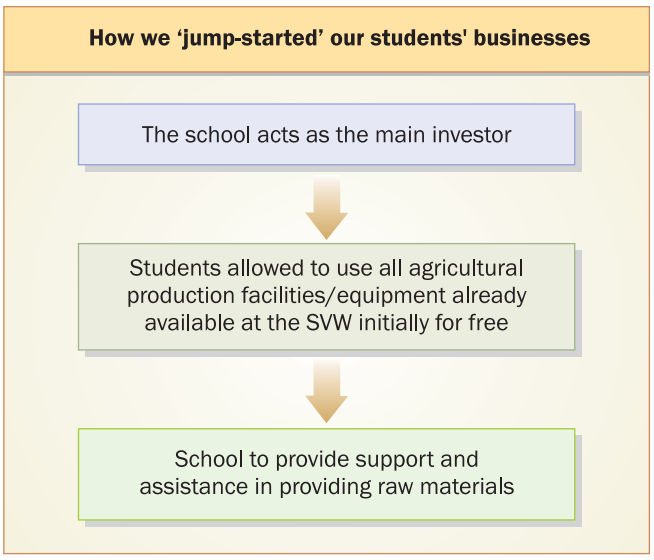
The SVW aspires to be the leading vocational and technical training institution in Brunei, and is responsible for providing outstanding, innovative and dynamic skill trainings (www.moe.edu.bn).

It is located on 198 acres of land at Kampong Wasan; approximately 30 min drive away from Bandar Seri Begawan, the capital city of Brunei. As one of the youngest training institution in Brunei, it now employs over 100 personnel, including 48 academic-staff of varied expertise from Brunei, Malaysia, India, Pakistan, New Zealand and the United Kingdom. Since 2006, over 600 students enrolled themselves for different training programmes, offered in the fields of agriculture, fisheries, food



Agriculture trainings at the SVW

New strategic aims of the SVW

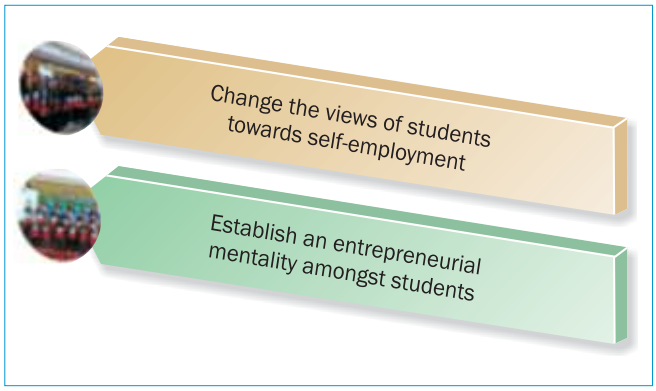


As a model school, the SVW is strategically aiming to rebrand itself, develop new partnerships with the industry, establish its own research and development department, incorporate agroforestry technologies and develop itself into a *Centre of Alternative Technology Education*.

The SVW currently enjoys a strong technical support from the Ministry of Industry and Primary Resources (MIPR) of Brunei, and a MoU between the SVW and the MIPR is already in the pipeline to strengthen further this collaboration.

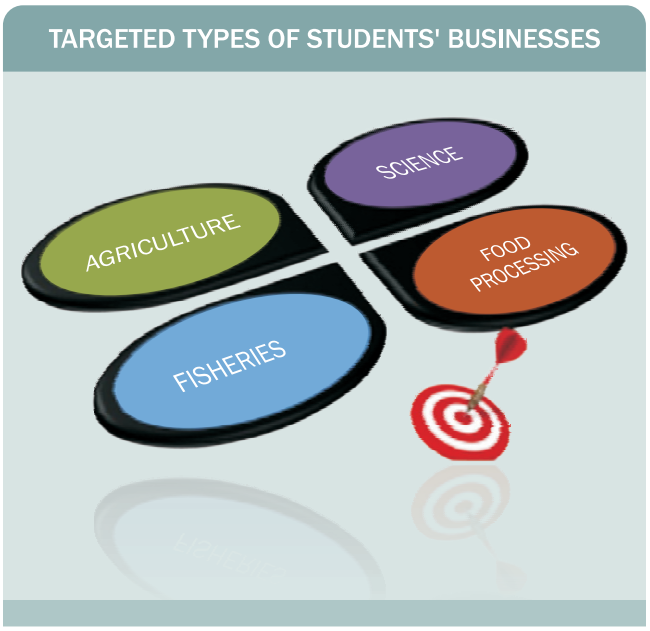
Agri-Entrepreneurship Education

On top of its niche agricultural programmes, the SVW is placing entrepreneurship education as one of its paramount campaigns. Its flagship entrepreneurship programme, **JumpStart**, aims to improve capacity of the students to earn by establishing an entrepreneurial mentality and by providing opportunity for them to learn and earn at the same time. Students are encouraged to form groups of between 2 and 10 people to set-up their own agricultural or agrifood businesses. All students' businesses are to be legally and officially registered with the Bruneian Office of the Registries of Business Names.



Two main reasons to introduce **JumpStart** at the SVW

The SVW's JumpStart reinforces learning of certificate and diploma students. Students develop personal qualities, leadership abilities, career and technical skills, teamwork and other skills that will enhance students' employability and marketability. It also makes learning enjoyable and meaningful for the students.



The SVW students now realize that it is possible to start-up a business at any age without waiting until they are 30 or 40. They have developed drive, ambition, passion and persistence; all for being successful.

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BRUNEI DARUSSALAM

Laila – A high-yielding rice variety

Laila is a high- yielding rice variety, developed by the International Rice Research Institute (IRRI). This was produced by crossing Pusa Basmati (IET 10364) and IR 58115-103-3-1-1. It was renamed as Laila; the reference number given to it by the Department of Agriculture and Agri-food was Brunei Darussalam Rice 1 or BDR1.

His Majesty, the Sultan and Yang Di-Pertuan of Brunei Darussalam, held out in the air the first cut of Laila

Laila was one of the twenty high-yielding rice lines that were received in the year 2000 from the IRRI through germplasm exchange programme. These lines were selected for tolerance to iron toxicity and for resistance to selected pests and diseases.

Based on the research for six seasons, two lines were finally selected – BDR 1 and BDR 2.

In 2005, regional trials were conducted with both the lines in Belait and Temburong Districts. BDR 1 performed better in terms of tolerance to iron toxicity and for resistance to pest and diseases. Furthermore, sensory tests also showed that BDR 2 had lower acceptance by the consumers.

In March 2009, a rice-variety naming competition was organized by the Ministry of Industry and Primary Resources to find a suitable name for BDR 1. Laila was the chosen new name for BDR1. The name was officially declared by His Majesty, the Sultan Haji Hassanal Bolkiah Mu'izzaddin Waddaulah and Yang Di-Pertuan of Brunei Darussalam, on 28 April 2009.

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Livestock industry contributions to total agriculture produce

Since the past two decades, the Livestock Industry in Brunei has developed tremendously with the active participation of the private sector. It happened as the result of the strong commitment by the entrepreneurs and the effective and continuous support from the Government through the Department of Agriculture and Agrifood, Ministry of Industry and Primary Resources.

Utilization of technology and implementation of good animal husbandry practices have helped entrepreneurs achieve cost-effective production, increase in productivity and improvement in the farm-management practices. Besides poultry, processing sector has played an important role in the livestock industry.

The year 2010 witnessed local livestock industry contributing BND 131.99 million, equivalent to 58% out of Brunei's total agriculture produce, valued at BND 228.43 million. This was possible mainly due to the positive development of the broiler and the layer industries, which have reached to almost 100% self-sufficiency level in the last few years. The ruminant sector experienced a general decrease in local cattle and buffalo production, but a significant increase in the goat-meat production was observed. In 2010, population statistics showed 4,124 live-buffaloes, 852 live-cattle and 6,806 live-goats in the country. At present, efforts are being made to increase ruminants' production in the country.

Hua Ho Agricultural Farm

Among the successful entrepreneurs in the local poultry industry is the Hua Ho Agricultural Farm. The Farm comprises layers, broilers and hatching chicks. Layer farm had started operation in 1984 to supply eggs continuously and to achieve self-sufficiency.

In line with the rapid development of the poultry industry in the country, this farm has increased egg production by building more chicken-layer houses with full capacity, and so far it has five closed house systems. The company continues to expand its enterprise for broilers also.

Hua Ho agricultural chicken-layer closed house system

In 2010, Hua Ho contributed 44 million eggs or 34.7% out of the total local contribution, 1,390,605 broilers or 10.1% out of the total local contribution,and almost 3 million chicks or 19.16% out of the total local contribution.

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INDIA

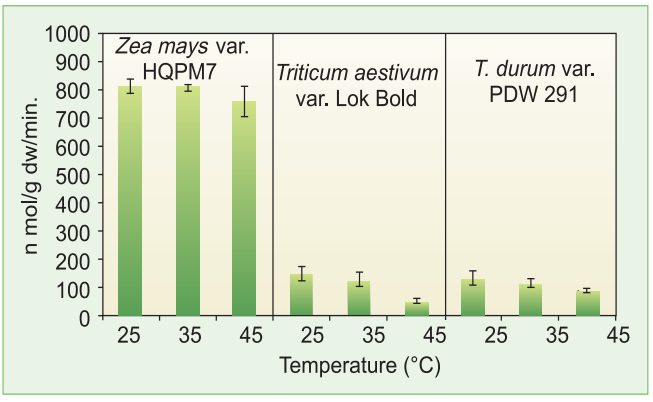
Improving thermo-tolerance in wheat

Climate change and abiotic stress affects agriculture and crop production; temperature is one of the most important climatic factors, adversely affecting grain yield and quality of wheat.

Average wheat yield was observed to be reduced by 4% for every one degree increase in temperature. High-temperature stress (>35ºC) during the grain-filling has the potential to modify grain-size and quality.

Starch synthesis and its accumulation depends on the activity of the soluble starch synthase (SSS) and starch branching enzyme (SBE). Electron microscopic studies of the thermo-tolerant (C 306) and susceptible (PBW 343) wheat cultivars exposed to high temperature (42ºC) showed bold and well-defined starch granules with abundant number of endosperm cells in C 306, and small, non-compact and non-spherical granules with lower number of endosperm cells in PBW 343. The problem seemed to be associated with the sink, where un-even distribution of starch granules was observed under terminal heat stress. Identification of source of heat tolerance in grain starch content in wheat seems to be an important step towards breeding for heat-tolerant wheats; especially deposition pattern of starch granules in endospermic cells. Biochemical and molecular studies on the synthesis and deposition of starch granules in different genotypes of wheat may prove useful in adaptation to terminal heat stress.

Decrease in grain growth under high temperature was found to be associated with a decrease in the soluble starch synthase (SSS) activity, as this enzyme is extremely sensitive to high temperature. A comparative analysis of SSS activity in wheat (*Triticum aestivum* var. Lok Bold and *Triticum durum* var. PDW 291), sensitive to high temperature at grain-filling, and in maize (*Zea mays* var. HQPM7) species tolerant to high temperature (~40ºC) was made to further understand the phenomenon. It was noticed that maize-grains had remarkably higher (3-4 times higher) SSS activity as compared to wheat. Further investigations revealed lower Km and higher catalytic efficiency of maize SSS compared to that of wheat. High temperature exposure of excised developing grains showed not any significant decrease in SSS activity in maize, whereas in wheat, a significant decrease of 66.8 % was observed. This indicates that an efficient and relatively thermo-stable SSS in maize could possibly be utilized in improving thermo-tolerance for grain-growth in wheat.



Soluble starch synthase (SSS) activity in the excised grains (20 days after application) following exposure to different temperatures in maize and wheat varieties (Bar represents mean ± SE)

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Production of nutraceuticals from Saen grass

Chemical analysis of grass (*Sehima nervosum*) revealed presence of cellulose 37.25±0.95%, xylan 28.10±0.04% and acid- detergent lignin 4.80±0.30%. Application of alkali from 2 to 12%, followed by incubation at room temperature, resulted in increase of relative yield of xylan, ranging from 8.79% to 58.79% with potassium hydroxide and from 13.34% to 89.39% with sodium hydroxide. And alkali application coupled with steam enabled further scaling up (83.38% with potassium hydroxide and 97.11% with sodium hydroxide) of the relative yield of xylan from the natural grass. The HPLC analysis of the xylan of *Sehima nervosum* grass revealed xylose 59.3%, arabinose 31.89% and glucose 8.78%. The Fourier Transform Infra Red (FTIR) Spectroscopy revealed absorption bands similar to typical xylan biomolecules. Commercial xylanase enzyme was applied over grass xylan for yielding XOS at various temperatures, *p*H, incubation times and enzyme concentrations, followed by detection of XOS yields through thin layer chromatography and HPLC analysis. With increased enzyme dose, there was breakdown of both xylan and XOS, which further resulted in

Sehima nervosum is one of the natural grasses, and is known as Saen grass in India, white grass in Australia, and it is also reported from Central East Africa and Sudan. As the grass is inherently rich in precursors of several industrially important biomolecules, fractionation of these precursors and application of biorefinery approach seemed promising. Production of nutraceuticals (prebiotic xylo-oligosaccharides) from lignocellulosic biomass is a promising and emerging alternative, since this material does not compete with food crops and is also comparatively less expensive than the conventional agricultural food-stocks. Therefore, an attempt was made to maximize yield of xylan from lignocellulosic biomass like natural grass, followed by enzymatic production of xylooligosaccharides (XOS).

diminishing xylan concentration and increasing xylose accumulation. Response Surface Method (RSM) analysis was applied to minimize xylose concentration and to maximize xylobiose and xylotriose concentrations for inputs at different levels i.e. *p*H, enzyme dose, temperature and reaction time. From RSM analysis of the HPLC data, a maximum yield of xylobiose (2.20 mg/ml) was achieved at *p*H of 5.03, incubation temperature of 45.2°C, enzyme dose of 17.4 U for a reaction time of 10 hr. In order to obtain higher xylotriose (1.41 mg/ml) from enzymatic hydrolysis of xylan from *Sehima nervosum*, ideal conditions from response surface model were as follows: *p*H 5.11, temperature 40.3°C, enzyme dose 13.2 U and reaction time 17 hr. Future perspects of XOS from grass depends on its economic production on an industrial scale and its validation as prebiotics either through animal model or through human clinical trials.

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DNA barcoding of insects

DNA barcoding is a technique by which insect species identification is carried out by analyzing sequences of small fragments of mitochondrial genome, ITS1, ITS2, 16sRNA, CYTB, ND5, and others. Mitochondrial genome has relatively fast mutation rate and results in variations in mtDNA of different species. A 648bp region of mitochondrial cytochrome oxidase subunit I gene, in general, is used in DNA barcoding. DNA barcodes for 62 insect species including pests (6), invasive pests (4), predators (14), parasitoids (22) and ants (16), and also a database named "Insect Barcode Informática (IBIn)" have been developed.

Identification of insects based on morphological characters for the last 200 years has resulted in description of 1.7 million species, which is only 10 % of the total number of species estimated. In this context, identification of insects seems to be a monumental task and would call for availability of more specialists and more funding. But with the advent of the molecular biology and molecular tools, identification of life-forms including insects has become quick, precise and easy. Molecular systematics is not state-specific and does not need trained taxonomists, and it is rapid and helps in differentiating biotypes.

Main advantage of DNA barcoding is rapid acquisition of molecular data. It is extremely useful for unambiguous identification of biological specimens and for more efficiently managing species diversity in Gene Banks. Identification of invasive insect-pests has also become possible using DNA barcoding.

IBIn is an online database resource developed on the insect domain, furnishing support on acquisition, storage, analysis and publication of DNA barcode records of agriculturally important insects for researchers all-over in India. Insect Barcode Informática has information on the number of insect species in the world and India, number of insects barcoded, statistics of order-wise information on number of insects barcoded in India and the world. In India, researchers working on molecular characterization of insects can log onto the web site: http://202.141.78.173/barcode2/ and submit their sequences for analysis and generation of barcodes. Indian accession number will be assigned automatically for submission of each barcode record. The details required for submission of barcode records are taxonomic position of the insect, collection locality (place, state and country), barcode marker (name of the gene), source (reference), author's name, institute's address and nucleotide sequence. The barcode image will be created as per the standards evolved by BOLD for the given nucleotide sequence, and the record will be stored in the insect barcode database.

The identity of the nationally important invasive pest, papaya mealybug, was confirmed using DNA barcoding, which helped in taking appropriate biocontrol measures. Identity of the exotic parasitoid of this pest was confirmed as *Acerophagus papayae* using DNA barcode. Barcode for coconut leaf beetle, *Brontispa longissima*, a potential invasive pest has also been generated.

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INDONESIA

Improved crop varieties

In 2011, IAARD released a number of improved varieties of rice, maize, soybean, peanut and sweet-potato. Of the 17 improved varieties of rice released in 2011, eleven were of inbred rice. Five of the seven varieties of maize released in 2011 were hybrids.

New variety of soybean, Gema, is a super-early maturing variety; can be harvested in 73 days. It produced higher than Burangrang variety. In addition to making *tempe*, Gema can be processed for tofu. The yield percentage of tofu from 8 kg Gema-seeds is 267; higher than that from the imported soybean (only 235%).

Two improved peanut varieties are Hypoma 1 and Hypoma 2. Hypoma 1 was found moderately resistant to leaf-spot, leaf-rust and bacterial wilt (*Ralstonia solanacearum*). Hypoma 2 showed good adaptability to drought and moderate resistance to leaf- spot and leaf-

Improved rice varieties

Variety	Maturity (days)	Yield potential (tonnes/ha)	Important characteristics	Agroecosystem for development
Inpari 14 Pakuan	113	8.2	Moderately resistant to BLB III and blast race 033 and 133	Rainfed lowland
Inpari 15 Parahyangan	117	7.5	Moderately resistant to BPH 1	Rainfed lowland
Inpari 16 Pasundan	118	7.6	Resistant to BLB III and blast race 033	Rainfed lowland
Inpari 17	111	7.9	Resistant to BLB III, IV, VIII and blast race 033 and 133, moderately resistant to BPH 1 and 2	Irrigated lowland
Inpari 18	120	9.5	Resistant to BPH 1 and 2	Irrigated lowland and rainfed lowland
Inpari 19	104	9.5	Resistant to BPH 1 and 2, resistant to BLB III	Irrigated lowland and rainfed lowland
Inpari 20	104	8.8	Resistant to BLB III, moderately resistant to BPH 1	Irrigated lowland
Inpari Sidenuk	103	9.1	Moderately resistant to BPH 1, 2, 3, and BLB III	Irrigated lowland
Hipa 12 SBU	105	10.5	Moderately resistant to BPH 3 and BLB III	Irrigated lowland
Hipa 13	105	10.5	Moderately resistant to BPH 2and BLB III	Irrigated lowland
Hipa 14 SBU	112	12.1	Moderately resistant to BPH 2 and BLB III	Irrigated lowland
Hipa Jatim 1	119	10.0	Moderately susceptible to BPH 1, 2 and is of good taste	Irrigated lowland
Hipa Jatim 2	116	10.9	Moderately susceptible to BPH 3, moderately resistant to BLB III	Irrigated lowland
Hipa Jatim 3	117	10.7	Moderately resistant to BLB III	Irrigated lowland
Inpago 8	119	8.1	Resistant to blast race 033, 133, 073,173, tolerant to drought, moderately tolerant to Al	Upland
Inpago Unram 1	108	7.6	Resistant to blast race 033, 133, moderately tolerant to Al and Fe	Upland
Inpago Unsoed 1	110	7.2	Resistant to blast race 133, tolerant to Fe, moderately tolerant to drought	Upland

BLB III, IV, VIII = bacterial leaf blight strain III, IV and VIII
BPH 1, 2, 3 = brown planthopper biotype 1, 2 and 3
Al= aluminium; Fe = iron

Improved maize varieties

Variety	Yield potential (tonnes/ha)	Maturity (days)	Reaction to downy mildew	Reaction to leaf- blight	Superiority
Hybrid					
Bima 12 Q	9.3	98	Susceptible	Resistant	Quality protein maize, lysine 0.52%, tryptophan 0.11%
Bima 13 Q	9.8	103	Moderately susceptible	Resistant	Quality protein maize, lysine 0.46%, tryptophan 0.09%
Bima 14 Batara	12.9	95	Resistant	-	
Bima 15 Sayang	13.2	100	Moderately resistant	-	
Bima 16	12.4	100	Resistant	-	Suitable for suboptimal land
Open pollinated					
Provit A1	7.4	96	Susceptible	-	Beta-carotene content 0.081 ppm
Provit A2	8.8	98	Susceptible	-	Beta-carotene content 0.144 ppm

rust. Both mature in 90-91 days; 4-5 days earlier than Jerapah variety and 14-15 days earlier than Singa variety.

Two improved sweet-potato varieties are Antin1 and Antin 2. Both have high anthocyanin content.

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Technology standardized for *corn-rice production*

Corn is a potential substitute or a potential supplement of rice as a staple-food for most of the Indonesian people. It is a staple-food for a part of the rural dwellers, especially in Central Java, East Java, East Nusa Tenggara and Sulawesi. In Gorontalo, observation showed that corn consumption by rural dwellers was only 30% among other foodstuffs, as eating corn caused abdominal obstruction.

In Central Java, rural dwellers processed corn-rice by soaking corn-grits in water, called spontaneous fermentation. Corn-soaking in water promotes microbes to grow spontaneously and uncontrollably, resulting in sour taste of the corn-rice produced. The Indonesian Center for Agricultural Post-harvest Research and Development (ICAPRD) has developed a technology for producing standardized quality of corn-rice through fermentation using lactic-acid bacteria. This fermented corn-rice causes no abdominal obstruction, can be cooked faster, and does not taste sour.

Advantages of modified corn-rice

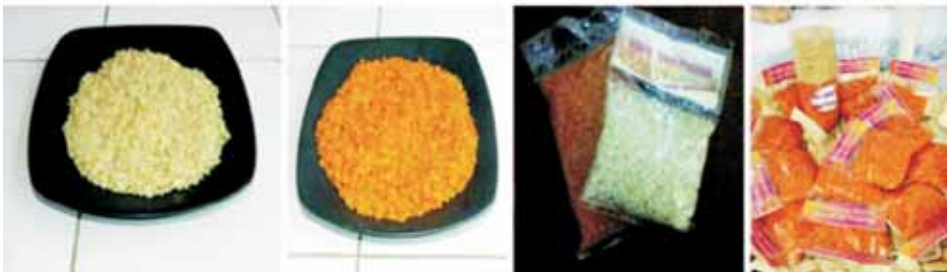
- Longer storage life and not easily contaminated with aflatoxin.
- Higher digestibility, so does not cause abdominal obstruction.
- Low Glycemic indices and so it is suitable for diabetics.
- Not of sour taste, as often is with the conventional corn-rice processing.
- Faster cooking time, only takes 15 min using rice cooker, or same as rice, so corn-rice can be cooked together with rice.

Improved maize varieties Srikandi Putih, Anoman and Bisi 2 as well as local varieties Tretep, Kodok, Tlogomulyo, Sili and Pulu can be utilized for corn-rice production. Ten colonies of fungi, five colonies of moulds and five species of bacteria were isolated from the soaking-water after 72 hours. The fungi mainly were *Aspergillus, Mucor, Fusarium* and *Rhizopus* with amilolitic characteristics, and moulds were *Torulopsis* sp. and *Candida* sp. and *Candida guilliermondii*. The dominant bacteria were *Bacillus cereus, Pseudomonas flourescens, Staphylococcus saprophyticus, Leifsonia aquatica* and *Staphylococcus haemolyticus*. These lactic-acid bacteria are non-amilolitic. The best starter is a mixture of all, excepting *Aspergillus niger*. Using the best starter, corn-rice produced was with 3.38-6.05% water content; this is classified as very dry. This prevents microbial infestation, aflatoxin contamination as well as extends shelf-life of the corn-rice to more than a year. Corn-rice ash content varies from 0.29% to 0.45%, fat from 0.009 to 0.011%, protein from 5.18 to 9.60%, and carbohydrates from 84.73 to 89.92%. Its cooking time is 15-20 min. Modified corn-rice processing using microbes and preboiling reduced cooking time from 2-3 hours to less than 20 min. Digestibility of the modified corn-rice ranged from 64.32% to 81.36%, and for the non-modified corn- rice (spontaneous fermentation), it was between 59.73 and 66.68%. Insoluble fibres in the modified corn-rice were 5.02-6.60% and dietary fibres were 1.19-1.42%; the lowest fibres found were from Sili and the highest were from Bisi 2 and Tretep. Corn-rice showing low soluble dietary fibres has high starch digestibility. Glycemic indices (GIs) for fermented corn-rice are very low, ranging from 28.66 to 41.74; the highest GI is of Srikandi Putih variety.

Corn grains

Corn grits

Soaking corn grits



Parboiled corn grits of local variety and improved variety Bisi 2

Processing of modified corn-rice

Fermentation process decreased aflatoxin contents from 9.21to10.79 ppb. After storage for three months, the content was less than 0.5 ppb, while the contents of the unfermented corn-rice increased to 12.59-26.36 ppb. Thus, modification of corn-rice processing using microbes suppresses aflatoxin contamination and extends storage-life of corn- rice.

Cost of corn as a raw material ranged from IDR 3,500 to IDR 7,000/kg and modified corn-rice at the consumer level was IDR 10,000/kg. Production of 1 kg starter needs IDR 12,500, which will return IDR 100,000.

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Sugarcane-livestock farming reduces greenhouse gases emission

In Sugarcane Centre of Lambur Village, Mrebet District, Purbalingga, Central Java, on 5 hectares of land, owned by Mugilestari farmers' group, integrated sugarcane plantation-livestock farming was developed. Application of 5 tonnes of organic fertilizers/ha, and leaf removing and maintenance of drainage channels increased sugarcane productivity to more than 100 tonnes/ha. Shoots and dried leaves yield was 28 tonnes/ha, which are high protein feeds.

Two biogas units with a capacity of 5 m^3 livestock wastes produced 2.16 m^3 biogas; adequate to meet needs of two farmer families to cook for three hours each. A month-old sugarcane plantation showed CO_2 emission of 0.66 tonnes/ha/month and of N_2O 3.63 tonnes/ha/month. Methane from the wastes of 16 cattle reached at 3.24 m^3/day (1,083 m^3/year). Added value of the methane emission as the fuel for household obtained from two biogas units was estimated at IDR 912,000/farmer.

Plant and processing wastes of sugarcane and livestock wastes are potential sources for renewable energy such as ethanol and biogas, thereby reducing greenhouse gases emissions.

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MYANMAR

Good Agricultural Practices for hybrid rice production

The Ministry of Agriculture and Irrigation (MOAI) is undertaking various measures for increasing rice production, and has placed a high priority on increasing rice yield per acre.

Considering the successful development and use of hybrid rice in China and the progress made by India, Vietnam, and several other countries, the Government of Myanmar, working in collaboration with China and the International Rice Research Institute (IRRI), is exploring prospects of hybrid rice technology for increasing rice- yield potential.

SUCCESS STORY

Hybrid rice growers in Sagaing Region

In 2012 summer-rice season, two farmers from Wetlet Township, Sagaing Region of the Upper Myanmar, cultivated 875 acres with hybrid rice, after observing hybrid- rice model farm in Nay Pyi Taw.

In July 2012, 8,665 baskets of paddy could be harvested from 43 acres, 200 baskets per acre. An increase of 120-130 baskets was observed. In the ensuing summer-rice season in this region, arrangement is being made to grow hybrid rice in 50,000 acres.

Good Agricultural Practices (GAP) for production of over 100 baskets of paddy per acre

Farmers have been encouraged to grow high- yielding varieties as well as hybrid rice by GAP to produce over 100 baskets per acre (over 5 tonnes per hectare) of paddy.

1. To minimize seed losses and to ensure good seedling vigour, seeds must be sown on the raised bed. Total of seven raised beds of 3 feet x 120 feet x 4 inches are sufficient for one acre.
2. Sow six pyi (about 8 kg) of rice- seeds that should be pre-germinated and sown sparsely.
3. Seeds must be covered with well-decomposed manure to protect them from rains, birds and rodent damage.
4. To obtain uniform seedlings with vigorous tillers, continuous supply of irrigation water, without covering seed- beds, is required.
5. Rice seedlings 20-day-old with 3-5 tillers must be uprooted from the seed- beds and transplanted immediately in the field.
6. To ensure maximum effective number of tillers, seedlings must be transplanted at the depth of not more than one-and- half inches.
7. Plant one seedling with 4 -5 tillers per hill or 2 seedlings with 2 - 3 tillers.
8. Ensure growth of tillers emerging at 3 days interval through alternate wetting and drying.
9. To ensure good aeration, 120,000 to 150,000 hills per acre should be planted with plant spacing of 8 inches x 6 inches or 6 inches x 6 inches by skipping every 10 rows.
10. Ensure continuous water supply and care must be taken for good aeration.
11. Application of one bag of 50 kg compound fertilizer as basal is important. Apply two splits of 12.5 kg each of urea mixed with 3 bags of well- decomposed cow- dung manure at tillering stage and at booting stage.
12. Suppress weeds and non-effective tillers growth by submerging in irrigation water.
13. Ensure timely drainage for easing manual harvesting, and through combine harvester by hardening top soil layer at the ripening stage.
14. To minimize crop losses at harvesting, use of combine harvester and thresher needs to be encouraged.

(One basket = 46 lb; One hectare = 2.47 acre)

From 2011 monsoon-rice season, the MOAI has initiated pilot hybrid rice-seed production at the Shwe Taung Seed Farm and at the Yezin Agricultural University Hybrid Rice Seed Production Farm in collaboration with the Anhui Longping Hi-tech Seed Co. Ltd from China.

Recent progress in hybrid rice seed programmes has shown that dissemination of this technology requires: (*i*) strong commitment and support from the Government and scientists; (*ii*) co-operation among research programmes, seed production sector and extension service; (*iii*) international collaboration and co-ordination, (*iv*) Knowledge and skills required for staff as well as for seed-growers.

Initially, the MOAI is supporting to grow Palethwe hybrid rice seed in 100 acres in each of the State and the Region.

For sustainable development of hybrid rice programmes in the country, economics, genetics and agronomics, which are linked to hybrid-rice breeding and seed production need to be considered.

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Bioethanol production from sweet-sorghum

In some parts of the Myanmar, particularly the dry zones, scarcity of rains, low soil fertility, high alkalinity and severity of soil erosion have accelerated transformation of these zones into resource-poor and ecologically fragile areas. And in such areas, sweet-sorghum could alleviate scarcity of food, feed and fuel.

Investigations on the bioethanol production from sweet-sorghum were undertaken by the Sugarcane Extension and Technology Development Division, Department of Industrial Crops Development, Ministry of Agriculture and Irrigation at the Pyinmana Sugarcane Research Centre. Suitable varieties were introduced from the ICRISAT, India, and USA. Varietal evaluations were carried out in several parts of the country, including dry zones.

Sweet- sorghum yielded 18 - 24 tonnes of millable canes per area and each tonne of cane could produce at least 5 gallons of 96% bioethanol after fermentation and distillation of extracted juices.

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Promising method for rice-growing under rainfed conditions

Rainfed rice grown by the dry direct seeding method proved promising. Tillage operation and seeding method for the rainfed rice are similar to upland crops, sesame, corn and food-legumes, grown in April or May, at the start of the monsoon.

The young rice-plants grow well with the first showers of the season. When the monsoon intensifies at the mid-monsoon season, water is allowed to be accumulated by preparing bunds. And then the crop is managed and maintained like a regular lowland rice-crop. The results indicated that rice varieties, Yar 2, Sinthwelatt, Yezin Lonethwe and Yar 9 performed well and gave good yields with dry direct seeding method (Thukhayin: 3.56 tonnes/ha; Yezin Lonethwe, 4.74 tonnes/ha; Sinthwelatt, 6.05 tonnes/ha; Yar 2, 6.22 tonnes/ha; Yar 9, 4.55 tonnes/ha).

The tested rice varieties received enough rainfall in August, and this coincided with 50% heading of these varieties. Heavy rainfall in Nay Pyi Taw, Yezin, in the month in 2009 was best for yielding higher production.

By adopting this method, farmers could reduce production cost for seedling nursery and also transplanting cost. Moreover, it reduced the risk of crop failure and low grain yields due to irregular rainfall during the growing season. Besides, farmers could get advantage of preparing for successive crop in the late monsoon or winter season by early sowing of monsoon-rice under rainfed conditions. Dry direct seeding method is ideal for adapting not only to climate change but also to the current economic situation of the rice-industry of the country.

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High-yielding package technology for sugarcane

In Myanmar, from 2001-02 to 2009-10, average sugarcane yield at the national level stagnated around 21 million tonnes/ acre (51.97 million tonnes/ha), which was lower than 26.82 million tonnes/acre (66.27 million tonnes /ha) of Asia and 26.84 million tonnes/acre (66.32 million tonnes/ha) of the world cane yield. To raise the profit from sugarcane production, not only the production cost needs to be reduced but yield per unit area of plant and ratoon cane is required to be raised. To increase sugarcane yield, it is important to have new improved package of agro-technologies for sugarcane.

Sugarcane Division has introduced a new high-yielding package technology since 2007, and the sugarcane areas have adopted this technology. The Division is emphasizing to increase sugarcane ratoon yield also. Sugarcane productivity and farm income could be increased from plant and ratoon yields from the same farm land.

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❑

SINGAPORE

Spawned pompano-fry on a commercially viable scale

The Agri-Food and Veterinary Authority of Singapore (AVA) has for the first time spawned successfully pompano-fry on a commercially viable scale. With spawning pompano-fry in the local waters, people can enjoy locally bred pompanos (commonly known as golden pomfrets) in restaurants and from retail outlets. The technology has been transferred to local farms for breeding this fish, thus reducing reliance on the imported fry. A ready supply of pompano-fry would boost local food-fish production and contribute to increased fish supply.

In 2011, local production of pompano was about 46 tonnes. By 2012 end, the supply of pompano is expected to double, to about 100 tonnes. This means that AVA is about to meet its 15% target for self-sufficiency in fish.

The AVA continues to support local fish farms by providing technical assistance, advising on good farm management and by conducting workshops to enhance farmers' technical knowledge on the fish husbandry, health and nutrition.

Pompanos are cultured in netcages in coastal fish farms. (*Inset*: Pompano juveniles ready for stocking into the open-sea cages)

To promote locally produced fish to consumers, the "SG Fish" brand was launched in December 2011. With the tagline "Fresh from Singapore", this brand allows consumers to easily identify fishes that are grown locally. At the same time, AVA worked with a major supermarket chain to set-up cooking stations in the selected outlets, where chefs demonstrated ways to cook pompano.

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❑

BRUNEI DARUSSALAM

First hybrid rice (Beras Titih) launching and contract agreement signing ceremony for Hybrid Rice Development Cooperation Project

Contract for Hybrid Rice Development Cooperation Project between the Government of His Majesty, Sultan Paduka Seri and Yang Di-Brunei Darussalam, with the Sunland Agri-Tech Pvt. Ltd, a company from the Republic of Singapore, was held on 9 May 2012 at the Dewan Setia Pahlawan, Ministry of Industry and Primary Resources.

Representing the Government of His Majesty, Paduka Seri Sultan and Yang Di-Brunei Darussalam, was Hjh Aidah binti Haji Mohd Hanifah, Acting Director of Agriculture and Agrifood, and was witnessed by Dayang Fuziah bint Haji Hamdan, Assistant Director of Agriculture. The Sunland Agri-Tech Pvt. Ltd was represented by David Chen, Project Manager, and was witnessed by Earng Hong, a partner of the Sunland Agri-Tech Pvt. Ltd.

The Guest of Honour during the signing agreement was Honourable Pehin Orang Kaya Seri Utama Dato Seri Setia Awang Haji Yahya bin Begawan Mudim Dato Paduka Hj Bakar, Minister of Industry and Primary Resources. Also His Excellency, Mr Joseph Koh, Singapore High Commissioner, His Excellency, Hajah Normah Suria Hayati binti PJDSMDSU (Dr) Haji Awang Mohd Jamil Al-Sufri, Permanent Secretary, Ministry of Industry and Primary Resources, Awang Mohd Riza bin Dato Paduka Hj Mohd Yunus, Deputy Permanent Secretary, Ministry of Industry and Primary Resources (Industrial Development and Entrepreneurship), Heads of Departments and Senior Officials of the Ministry of Industry and Primary Resources, Senior Officials and Staffs of the Department of Agriculture and Agrifood and Rice Farmers/ Operators attended the signing ceremony.

Under the Hybrid Rice Project, five projects are to be carried out over a period of 2 years—(*i*)Technical Assistance for Breeding Project; (*ii*)Technical Assistance for Technology Transfer and Variety; *(iii)* Sale and Purchase of Trade Secret of new variety; *(iv)* The Consultancy Services for setting-up of Hybrid Rice Research Centre and Seed Production Facility; (*v*) The Consultancy Services for Rice Variety Registration Protocols.

Consultancy services will involve identified operators for registration of rice varieties as to protect rights of the Department of Agriculture and Agrifood as the owner of the hybrid varieties.

The Guest of Honour gave a cheque of one thousand dollars to the winner of naming hybrid rice, Abang Hariz bin Abang Hadzman; a student from the Sekolah Menengah Raja Isteri Pengiran Anak Saleha, Tutong.

The benefits to be derived from this project are: Higher yields; increased capacity of the Department of Agriculture and Agrifood staff as well as operators; increased infrastructure; and purchasing rights for the production of hybrid rice combination.

Prior to Contract Signing Ceremony, the Guest of Honour gave the new name for the hybrid rice variety SAT-11 as TITIH. This means "indomitable spirit identity of Brunei society for being hard-working".

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INDONESIA

Sustainable Food Reserve Gardens

Indonesia has 10.3 million hectares of yards or 14% of the total agricultural land. Yard utilization as a source of household food (crops, livestock and fish) has been practised for a long time, especially in the rural areas.

In late 2010, the Ministry of Agriculture had set a model of the Sustainable Food Reserve Garden (SFRG). The SFRG is a set of households that can create food self-sufficiency by utilizing their yards optimally.

The IAARD is mandated to develop the SFRG and to support technological innovations and technical

Sustainable Food Reserve Garden in narrow home-yard in Nogosari, Kayen, Pacitan (*left*), and in Talang Keramat, Banyuasin, South Sumatra (*right*).

assistances in all provinces in Indonesia. Urban yards are grouped into four clusters—(*i*) without yard (housing type 21 with total land area of 36 m^2); (*ii*) narrow yard (housing type 36 with land area of about 72 m^2); (*iii*) medium yard (housing type 45 with land area of 90 m^2) and (*iv*) wide yard (housing types 54 or 60 with land area of about 120 m^2). Rural yards are also classified into four groups— (*i*) very narrow yard (without yard); (*ii*) narrow yard (<120 m^2); (*iii*) medium yard (120-400 m^2) and (*iv*) wide yard (> 400 m^2).

Selection of the cultivated commodities is based on the food and nutrition needs of the families as well as on the possibilities of the region-based commercial developments. On the wide yards, households are able to have fish ponds and can rear poultry and small ruminants.

Seed availability determines the sustainability of the SFRG. Therefore, it is necessary to establish village nurseries in each region. Cropping pattern and crop rotation, including integrated crop and livestock systems and diversification models, need to be properly formulated to meet expected food patterns and contribution to family income.

The pilot of the SFRG was established in February 2011 at Jelok, Kayen Village, Pacitan, East Java. The yards were grouped into three clusters: narrow (< 100 m^2), medium (200-300 m^2) and large (> 300 m^2). Households, having narrow yard could grow vegetables using verticulture system. Those having medium yards could grow vegetables and medicinal plants in beds or using verticulture and could rear chickens, and those with large yards could have goat- pen, tuber crops and shade trees.

In East Java, SFRG was developed in Pasuruan, Mojokerto, Jombang, Surabaya and Malang Districts, and in Malang City. The village nursery can reduce household expenditure between IDR 195,000 and 715,000/month, and increase index of expected food patterns from 76.3 to 83.3%.

Application of the SFRG has been extended to all provinces in Indonesia; in 2011, all provinces in Indonesia implemented the SFRG. In 2012, the model will be developed for all districts/cities.

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THAILAND

FAO/OIE Global Conference on Foot-and-Mouth Disease Control

The country in collaboration with the Food and Agriculture Organization (FAO) of the United Nations and the World Organization for Animal Health (OIE) hosted this Global Conference on 27-29 June 2012.

While FMD is seldom fatal, it can cause high mortality in newborn and young animals; weight loss, reduced milk yields and lower fertility are also observed in the affected animals. Global annual cost on the FMD, in terms of production losses and on prevention measures through vaccination, is estimated at approximately USD 5 billion.

The FMD Global Strategy has been prepared by the FAO and the OIE under the umbrella of the **Global Framework for the Progressive Control of Transboundary Animal Diseases (GFTADs)** in consultation with the selected experts, countries and donors as well as with the regional and the international organizations. Particular emphasis has been given to the regions of the world, where disease is endemic, including most of the sub-Saharan Africa, the Middle East and Asia.

Global Strategy

The Global Strategy combines two tools, developed by the FAO and the OIE. The OIE tool, called the *Performance of Veterinary Services Pathway (PVS)*, evaluates national veterinary services to bring them into compliance with the OIE quality standards. Reliable veterinary services ensure quality and safety of livestock production. And strong veterinary systems protect safety of food sources, trade and animal health.

The FAO developed the *Progressive Control Pathway (PCP) for Foot-and-Mouth Disease (PCP-FMD)* that guides countries through a series of incremental steps for better management of FMD risks; beginning with the active surveillance to establish what types of FMD virus strains are there in the country and neighbouring areas. The process moves countries continuously towards upgraded levels of FMD control. A key pillar of the PCP-FMD involves coordinating efforts with countries in the same region to control the disease systematically across the porous national boundaries.

The aim of the FMD Global Strategy is to decrease impact of the FMD worldwide; by reducing number of disease outbreaks in the affected countries until they attain FMD-free status, as well as in maintaining the official FMD-free status of the countries that are already free. With many countries in the earliest stages of the FMD control, the PCP-FMD benchmarks progress with the aim of applying to the OIE for official recognition of their national control programmes and of their FMD-free status with or without vaccination.

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VIETNAM

2nd Global Conference on Agriculture, Food Security and Climate Change: *"Hunger for Action"*

This conference was held in Hanoi, Vietnam, from 3 to 7 September 2012 and elaborated on the key messages, which are presented here. This Communiqué is a Co-Chairs' Summary. It builds upon the Roadmap of Action of the 1st Conference, held in the Hague, the Netherlands.

It recognizes that food security, poverty, climate change and sustainable development are closely linked, and can no longer be considered separately, and underscores that agricultural policies have an important role to play with regard to the challenges.

Climate-Smart Agriculture – *A Forward-Looking Perspective*

Important commitments and actions are being undertaken to tackle the challenges of food security and nutrition, poverty, climate change and sustainable development, and climate-smart agriculture (CSA) is an important approach in this regard, as it aims to:

- Increase agricultural productivity and farmers' income; strengthen the resilience (adaptation) of ecosystems and livelihoods to climate change; and reduce greenhouse gas (GHG) emissions;
- Take into consideration context-specific and locally-adapted actions and interventions, along with the whole agricultural value-chain;
- Strengthen the knowledge base on sustainable practices, as well as on financial and policy options that would enable countries and communities to meet their food, water and nutritional security and development goals;
- Take a people-centred approach, keeping farmers and those most vulnerable, including women, at the heart of the dialogue, decision-making and action, and empowering them as critical agents of change;
- Improve farmers' access to and awareness of available knowledge services, finance, agricultural inputs, rights (for example, land tenure rights) as well as increase availability of these resources.

Future-Oriented Policies and Governance – *New and Integrated Approaches*

Relevant policies that are climate-resilient, water-smart, energy-efficient, reliant on diverse renewable energy sources, and also promote inclusive green growth outcomes should be integrated into countries' overall development strategies, particularly those that:

- Encourage investments in a range of integrated approaches at various scales such as landscape and ecosystem approaches, sustainable oceans management approaches - that build synergies and manage trade-offs in an equitable way;
- Are harmonized and coordinated, and that remove obstacles that impede implementation of existing and innovative CSA systems, technologies, and practices that are tailored to a country's or community's specific needs;
- Implement and scale-up innovative successful programmes and best practices that combine sustainable agriculture and land-use, forestry, and sustainable fisheries and aquaculture, through local, regional, sub-regional and national programmes and institutions, as a matter of priority;
- Enhance integrated, systems-based approaches, strategies and institutional arrangements that span across different sectors, ministries and intergovernmental organizations;
- Significantly reduce losses in the food production and supply chain, including post-harvest losses and food waste by promoting sustainable consumption and production patterns;
- Promote and upscale sustainable food production practices, including those based on the local and indigenous knowledge;
- Incentivize and engage youth, future farmers, in the agriculture sector;
- Address sustainable management of oceans for food security and livelihood, including addressing illegal, unreported and unregulated fishing;
- Implement and scale- up actions towards restoring degraded lands and addressing drought issues.

Managing Risks and Price Volatility – *In a Changing Climate*

Managing a wide variety of risks, especially in the current global situation of price volatility and increased climatic variability, calls for responsible and cooperative action by all actors to address rise in food prices, through improved international coordination and information sharing, and implementation of safety-net programmes and social protection networks to build resilience. Furthermore, steps need to be taken to:

- Promote policies and measures which contribute to well-functioning and stable markets, and the means to mitigate and manage risks of price volatility of agricultural commodities;
- Improve market transparency and engage in frequent reporting of reliable statistics through successful

models such as the Agriculture Market Information System (AMIS), which has been able to provide timely information and thereby improved ability to coordinate responses to market uncertainties;

- Promote international cooperation and avoid unilateral measures such as export bans;
- Elaborate role of biofuel mandates and their relationship to food price volatility;
- Ensure that agricultural subsidies do not distort agricultural commodity prices/trade;
- Improve risk management for vulnerable communities, through instruments such as insurance schemes and safety-net programmes, as well as through improved access to weather information adapted to farmers' needs;
- Support low-income food-importing countries, with particular attention for vulnerable families and children;
- Address scientific, technical and socio-economic aspects of adaptation and mitigation in agriculture and their synergies within the international food security and climate change processes, for example, through further work under the UNFCCC SBSTA.

Science, Innovation and Applied Research – *Farmers' First*

Both private and public involvement and investment are necessary to enhance (farm- and integrated landscape-level) agricultural research, extension services, training and education to enhance sustainable agriculture and to respond to climate change. Science-based policy needs to be further bolstered by:

- Stock-taking of existing sustainable practices, including local and indigenous knowledge, and farmers' innovation, particularly where these might become relevant under future climate patterns;
- Getting existing technologies off- the- shelf and into the hands of (small-holder) farmers, thereby improving their access to information, technical knowledge – for example through ICT options;
- Compiling, developing, adapting and making available, approaches, practices and innovations that will allow producers (especially small holders) to sustainably increase productivity, reduce need for external inputs, use and protect ecosystem services, and build resilience to the impacts of the climate change;
- Creating platforms/learning hubs (such as the CSA Knowledge Platform2), and bringing together farmer groups/associations at the grassroots level to facilitate dialogue and knowledge-sharing, and to building capacity to innovate and adopt CSA practices;
- Investing in the research and development of non-proprietary plant varieties and breeds with required nutritional, productivity, and disease and climate resistance traits, needed by different producers;
- Assessing potential trade-offs and synergies between adaptation and mitigation actions, taking into consideration local circumstances and needs.

Private Sector – *Entrepreneurs as Drivers of Change*

There is a need for a paradigm shift in the role of the private sector, and private-public partnerships in the CSA efforts, through:

- Putting farmers (including small-scale farmers) in the driver's seat by strengthening their position in the agricultural value-chain through capacity-building efforts and increasing their access to technologies;
- The institutionalization and scaling-up of private sector involvement in the agricultural value-chain, keeping in mind small-holder farmer needs;
- Partnerships between the private sector and farmers/ farmers groups and cooperatives to promote production of high-quality products.

Innovative Partnerships – *Engaging all Stakeholders*

Existing as well as new and innovative partnerships among farmers, governments, businesses, academia, civil society, and other stakeholders can play an important role in enhancing capacity and technology. In a bid to further encourage and strengthen such collaborative approaches, it is necessary to:

- Enable different stakeholders to resolve their diverse interests and goals, while working within a common (global) framework;
- Form interactive partnerships that can enhance knowledge-sharing between stakeholders, including scientists, farmers, private sector, civil society and governments, with participatory agenda-setting, for example through initiatives such as the Global Research Alliance;
- Engage in inclusive processes that consistently engage a variety of stakeholders across various levels, from community to global;
- Enable communities to be key-players in generating and sharing solutions by developing knowledge platforms, in particular to promote South-South cooperation;
- Move from public-private to private-public partnerships.

Investing in the CSA – *Towards Accessible Financing*

There is a need to respond to the compelling and urgent need to invest more and better in the sustainable agriculture to enable the sector to achieve food security

and nutrition for all as well as broader sustainable development goals in the face of climate change and degrading agro-ecosystems, through:

- Providing financial mechanisms and incentives that overcome short-term adoption barriers, provide payment for ecosystem services, and create positive drivers for sustainable agricultural production;
- Strengthen public and private co-investments for national and community efforts to implement context-appropriate sustainable agricultural practices, policies, as well as institutional and infrastructure strengthening;
- Shifting investment mechanisms away from sectoral approaches to towards integrated ones;
- Ensuring that financing for the CSA adds value to broader sustainable development efforts and prioritizes adaptation concerns of the small-scale farmers and vulnerable groups;
- Exploring various financing options and transaction costs (public, private, development, climate) for implementation of nationally and locally owned best-practice approaches and activities;
- Ensuring financing mechanisms such as REDD+; taking into consideration, and appropriately address the fact that agriculture is a major driver of deforestation;
- The promotion of innovative ways to direct finance to all farmers, especially small-scale farmers;
- Enabling small-holder access to financing from commercial banks and insurance companies (for example, by addressing issue of stringent collateral requirements);
- Encouraging private sector investment by reducing or insuring against risk (for example, through funding transitional programmes that enable eventual private sector investment).

The Way Forward – Linking with Ongoing Processes

The outcomes of the Second Global Conference on Agriculture, Food Security and Climate Change, in Hanoi will contribute to and link with a variety of national, regional and international processes such as the Rio +20 follow-up process, the work of the Committee on the World Food Security (CFS), as well as the ongoing climate change negotiations under the UNFCCC.

The outcomes will add momentum to resilience and productivity that has been building-up in the international community.

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FORTHCOMING CONFERENCES

- Third International Agronomy Congress will be held on 26-30 November 2012 at New Delhi, India
- 5th Joint Australian and New Zealand Soil Science Conference will be held on 2-7 December 2012 at Tasmania, Australia
- 2013 Annual Land Use Conference: *Land Use for a Lifetime: Changing Demographics and Shifting Priorities* will be held on 7-8 March 2013 at Denver, Colorado, United States of America
- American Water Resources Association (AWRA) Spring Speciality Conference: *Agricultural Hydrology and Water Quality II* will be held on 25-27 March 2013 at St Louis, MO, USA
- Biohydrology Conference 2013 will be held on 21-24 May 2013 at Landau/Pfalz, Germany.
- ICSAEF 2013: International Conference on Sustainable Agriculture, Environment and Forestry, will be held on 8-9 July 2013 at London, United Kingdom

BRUNEI DARUSSALAM

Farmers' and Fishermen's Day 2011

This was the second time Brunei celebrated the event since His Majesty, the Sultan and Yang Di-Pertuan of Brunei Darussalam, declared that the **Farmers' and Fishermen's** Day would be observed on 1 November. It is meant to express appreciation for the hard work and contributions of the local farmers and fishermen in country's economy. In a ceremony, held at the Kg Parit Mini Recreational Park, Minister of Industry and Primary Resources, Pehin Irang kaya Seri Utama Dato Seri Setia Hj Yahya Begawan Mudim Dato Paduka Hj Bakar presented the awards.

The winners were divided into seven categories. In the first category, Lau How Teck, Managing Director of the Hua Ho Agricultural Farm and Ladang Tunas Harapan Sdn Bhd, was awarded as the *Successful Farmer*.

In the agricultural sector, the winner had produced 318,305 metric tonnes of fruits and over 88 metric tonnes of vegetables in 2010.

In the second category of the farmer group, the *Successful Padi Entrepreneur Award*, newly introduced, was awarded to Usop Kaling, owner of the Syarikat Perusahaan Kemikit. He began rice farming in 1986 and produced 41 metric tonnes of paddy consistently for the last five years.

The third category is the *Viable Farmer Award*; this award was presented to Pg Isa Pg Hj Aliuddin, manager and owner of the Syarikat Mumtaz Poultry.

The fourth award under the category of *Innovative Farmer* was given to Chai Sai Yun, manager and owner of the Wong Garden.

In the fishermen group category, Ampuan Ammilee Farahiyah Ampuan Hj Mohammad was announced as the winner of the *Successful Fisherman Award*.

The *Viable Fisherman Award* was given to Hj Abdullah Sumali Hj Md Salleh, owner and manager of the H A Sumali Dan Adik Beradik.

The recipient of the last category, the *Innovative Fisherman Award*, was Khoo Boon Choon, owner and manager of the Syarikat Khoo Boon Choon.

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INDIA

ASEAN-India Special Commemorative Summit 2012

India is hosting this Summit during 20–21 December 2012. A number of events – Car Rally, ASEAN Sailing Expedition by Sail Training Ship- INS Sudarshini, ASEAN-India Agricultural Ministers' Meeting; ASEAN-India Environment Ministers' Meeting, ASEAN-India MNRE Ministers' Meeting; fourth ASEAN India Eminent Persons' Group Meeting—will be organized.

The various events will provide a unique opportunity to showcase India and its strong relationship with the ASEAN audiences at home and overseas. Given the immense popularity and usage of web and social media platforms, to garner maximum mileage from these events, a branding and outreach campaign has been developed to bring all the partners onto a common platform.

The visual identity is the *ASEAN- India Commemorative Summit logo* (launched at Pnomh Penh by the External Affairs Minister together with the ASEAN Foreign Ministers on 11 July 2012), utilizing colours of the ASEAN and Indian flags.

The visual branding kit contains the logo CD, relevant material for logo usage, templates for advertisements, and guidelines for design of the office stationery.

Web-based programme is considered as the most suitable one as it provides a platform to initiate people to people engagement not only among the youth but also across a vast cross-section of people. The web-based outreach programme has been developed by a Mumbai-based firm, which is and will be responsible for: *(i)* Website development, hosting and management; *(ii)* Social media marketing, promotion and awareness generation, including opening and maintenance of Facebook page, twitter account, blogs; *(iii)* Live mapping of the sailing expedition; *(iv)* Live coverage of the car rally; *(v)* Live coverage of all events, including youth exchange programmes in India; *(vi)* One final video, covering all events within 4 weeks of completion of the campaign.

Facebook (facebook.com/aseanindia), Twitter (twitter.com/aseanindia), Google + (**gplus.to/aseanindia**), Youtube (youtube.com/aseanindia), Flickr (flickr.com/aseanindia) and FourSquare (foursquare.com/aseanindia) are already up and running with information. And the website (www.aseanindia.com) has also been developed. Ministries/partner organizations need not open separate pages for this purpose, and can very easily provide links to these sites through their current websites.

Relevant materials on the ASEAN related events for posting on the various social media sites and on the website i.e. videos, photographs, articles, reports, etc, may be forwarded on a regular basis by an e-mail to shivam@skarma.com and aseanpddivision@yahoo.com under the intimation to osdpd3@mea.gov.in, jspd@mea.gov.in, jsasean@mea.gov.in and c1asean@mea.gov.in.

e-mail: aseanpddivision@yahoo.com

PHILIPPINES

Philippine e-Extension for Agriculture and Fisheries to Adopt Communities of Practice

This activity was held at the Serrano Hall, Agricultural Training Institute Building, Quezon City, Philippines, on 30 March 2012.

The Philippines' e-Extension Programme for Agriculture and Fisheries will adopt the Communities of Practice (CoP) model patterned after the US Department of Agriculture's eXtension initiative. This development came after the presentation of Dr Gregory Crosby on the "*The Communities of Practice as Integral Component of e-Extension Initiatives*". For the eXtension of the USDA, a CoP is defined as a virtual network of subject-matter content providers, consisting of faculty, professional and para-professional staff, county educators, industry experts, clientele and government agency representation, who share knowledge or competence in a specific content area and are willing to work and learn together over a period of time to further develop and share that knowledge in the form of educational products and programmes. Specifically, a CoP aims to help meet knowledge needs of their respective Communities of Interest (CoI) or clientele, provide stewardship of the available knowledge for their specific content area, including revisions, updates and maintenance. Also, the group promotes best practice development of educational products and programmes, innovation in content area knowledge and delivery and ongoing engagement with their corresponding CoI. The forum was attended by the representatives of the various agencies under the Department of Agriculture as well as the Department of Science and Technology's Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development. Currently, the ATI plans to start Communities of Practice on swine and organic agriculture.

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Philippine e-Extension Programme in Inclusive Innovation Forum

The World Bank Group together with the Ministry of Finance of the People's Republic of China organized the Regional Inclusive Innovation Policy Forum on 23-24 May 2012 at the Hotel Nikko, New Century, Beijing, China.

Global discussions on inclusive innovation are now being done in support to the Millennium Development Goals; aiming especially for sustainable development in developing countries. With this goal, the World Bank Group together with the Ministry of Finance of the People's Republic of China organized the *Regional Inclusive Innovation Policy Forum* to share international and Chinese knowledge and experiences. It was hosted by the Asia-Pacific Finance and Development Centre in collaboration with the KDI School of Public Policy and Management.

Inclusive innovation plays a key role in promoting inclusive growth for ensuring equality in access to resources and basic services. With public authorities recognizing increasingly that equalizing of basic social services, especially between urban and rural areas, should become imperative to share benefits of the economic development, particularly in the emerging countries.

The Agricultural Training Institute, represented by its chief, Director Asterio P. Saliot, was invited to present e-Extension Programme at the Policy Forum. Other presenters came from the Ministries of Finance, and Central Banks from Vietnam, Indonesia, Laos, Japan and Korea among others.

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ATI e-Extension Programme in a KM Training-Workshop

This training-workshop was held at the Waterfront Insular Hotel, Lanang, Davao City, Philippines, on 31 May 2012.

The Agricultural Training Institute is one of the few institutions, which practice Knowledge Management (KM) for its various programmes and services.

It is in this regard that the ATI was invited to the Training-Workshop on Knowledge Management Capacity Building, conducted by the South-east Asian Regional Center for Graduate Study in Research and Agriculture (SEARCA) and DA-Bureau of Agricultural Research (DA-BAR).

The training-workshop aimed to discuss and understand concepts and tools of information and knowledge management as well as to agree on a conceptual definition and approach to KM that could be applied to agriculture and fisheries sectors.

KM comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences.

Other services that the ATI offers that employ KM are the production of Information Education and Communication (IEC) materials on various agricultural technologies.

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India-ASEAN Cooperation in Agriculture

– Gurjit Singh*

India and the ASEAN region collectively account for 1.8 billion people, which is a quarter of the humanity. However, arable land available for sustaining this large population, growing at around 1.5 % annually, is only 2.4% of the global land-mass. Close geographical proximity of the region and India leads to strong resemblance in their climate and socio-economic conditions. People of these regions are heavily reliant on the climate-sensitive sectors — agriculture, fisheries and forestry.

In 2003, at the 2nd India-ASEAN Summit in Bali, Indonesia, the Prime Minister of India had stressed the need for greater cooperation among the countries in agriculture and allied sectors. This led to setting-up of an ASEAN-India Working Group on Agriculture and Forestry (AIWGAF) in 2010. Its first Meeting was held in January 2011 in New Delhi that discussed and finalized its Terms of Reference and a draft Medium Term Plan for Cooperation (2011-2015). These were endorsed at the 1st ASEAN-India Agriculture Ministers' Meeting at Jakarta in October 2011.

The 2nd AIWGAF Meeting was held in Palembang, Indonesia, in March 2012 that decided on 7 activities to be implemented in 2012— trainings by the Central Institute of Agricultural Engineering (CIAE), Bhopal, on *Advances in Agricultural Equipment for Productivity Enhancement including Precision Farming* (23 April-5 May 2012), and *Processing and Value-Addition of Soy Products and Coarse Cereals* (7-19 May 2012); training at the Central Institute of Post-harvest Engineering and Technology (CIPHET), Ludhiana, on *Production and Processing Technology for Value-Addition of Horticultural Products* (30 April-12 May 2012). The Indian Council of Agricultural Research (ICAR) also organized a Workshop in New Delhi on *Adaptation/Mitigation Technologies for Climate Change in Agriculture in the ASEAN Region and India* (23-25 August 2012). This workshop came up with a concrete roadmap, delineating future joint activities, which would be submitted for endorsement to the 2nd meeting of the ASEAN-India Agriculture Ministers in New Delhi on 17 October 2012.

For bringing together policy-makers, agricultural research institutions and agro-industry representatives on a common platform to network and develop business relations, the Ministry of Agriculture, Government of India, is also organizing an ASEAN-India Agricultural Expo and Symposium in New Delhi on the sidelines of the Ministerial Meeting from 17 to 19 October 2012.

Plans for organizing exchange visits of farmers are also on the anvil. A delegation from India would visit Malaysia in November 2012, coinciding with the ASEAN Farmers' Week. Conversely, a farmers' delegation from the ASEAN member-states would visit India in December 2012.

India will organize a Conference of the Heads of Agricultural Universities and Research Agencies in February-March 2013 to identify strategies and to work out modalities for institutional networking and collaboration.

Agriculture and allied sectors hold tremendous potential for cooperation between India and the ASEAN. I am confident that our cooperation would grow from strength to strength in the years ahead, and bring mutual benefit to our people and economies.

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* Ambassador of India to Indonesia, Timor-Leste and ASEAN

2012 India-ASEAN Events Roll on

The 2nd meeting of the ASEAN-India Working Group on Agriculture and Forestry, organized at Palembang, Indonesia, on 6-8 March 2012

Organized 2 trainings, funded by the ASEAN-India Fund, at the Central Institute of Agricultural Engineering, Bhopal, India, on 23 April-5 May 2012 and on 7-19 May 2012 for the delegates from the ASEAN member-countries

Delegates of ASEAN-India Workshop at New Delhi from 23 to 25 August 2012 on *Adaptation/Mitigation Technologies for Climate Change in Agriculture*

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