

# **TENTH STEERING COMMITTEE MEETING**

**of**

## **ASIA-PACIFIC CONSORTIUM ON AGRICULTURAL BIOTECHNOLOGY (APCoAB)**

**30 JANUARY 2009**

**Venue:**

**Rama Gardens Hotel, Bangkok**

## **PROCEEDINGS**



**C/o ICRISAT Delhi Office, CG Centre Block,  
National Agricultural Science Centre Complex  
Dev Prakash Shastri Marg, Pusa Campus, New Delhi – 110 012, India**

**Proceedings of the Tenth Steering Committee Meeting  
of  
Asia-Pacific Consortium on Agricultural Biotechnology  
30 January 2009  
Rama Gardens Hotel, Bangkok**

**1. Introduction and Welcome**

The tenth Steering Committee (SC) Meeting of Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) was held on 30 January 2009 at Rama Gardens Hotel, Bangkok under the chairmanship of Dr. Abd. Shukor Abd. Rahman, Chairman, APAARI. The meeting was attended by eight other SC members/representatives and special invitees (Annexure-I). Dr. Robert Zeigler, DG, IRII; Dr. Dah-Jiang Lu, DG, Taiwan Agricultural Research Institute and Dr. Anil Bawa, Principal Scientist, ICAR attended the meeting as special invitees. Mr. Md. Harun-ur-Rashid, DG, BARC, Bangladesh, Dr. William Dar, DG, ICRISAT, Mr. Raju Barwale, Managing Director, Mahyco; Mr. Thierry Menneson, DG, Institut Agronomique Neo Caledonein; Dr. Mark Holderness, Executive Secretary, GFAR and Dr. Randy Huatea could not attend the meeting due to other commitments.

Chairman Dr. Abd Shukor in his welcome address highlighted the achievements of APCoAB. He made special mention of the Expert Consultation on “Agricultural Biotechnology for Promotion of Food Security in Developing Countries” held on 20–22 August 2008 in collaboration with MARDI which according to him was a very successful event. He was appreciative of the efforts made by APAARI, APCoAB and MARDI in assembling for this consultation a wide spectrum of international experts on biotechnology, agriculture policy, representatives of CSOs and farmer organizations. Dr. Abd Shukor highlighted the recent thrust of APCoAB on capacity building in areas of biotechnology that are of high relevance to the AP region. He felt that the training program on *in vitro* conservation, bioinformatics, and disease-free planting material production organized during the period under report would help in developing biotechnology expertise in the regional NARS and expressed the hope that such efforts would continue in future.

Dr. Raj Paroda, Executive Secretary, APAARI extended his welcome to the participants and thanked them for their support to APAARI and APCOAB. He expressed his appreciation of Dr. Zeigler for having attended the meeting despite his very hectic schedule. Dr. Paroda informed the committee about the approval granted by APAARI to the following reconstituted APCoAB SC:

	<b>APCoAB Steering Committee</b>
1.	Dr. Abd Shukor Abd. Rahman-Chairman
2.	Mr. Thierry Menneson
3.	Mr. Malcolm Hazelman
4.	Dr. Randy A. Hautea
5.	Dr. R.S. Paroda
6.	Mr. Md. Harun-ur-Rashid
7.	Dr. Mark Holderness
8.	Dr. William D. Dar
9.	Mr. Raju Barwale (Pvt. Sector Representative)
10.	Mr. Raul Montemayor (CSO Representative)

Dr. Paroda recalled the genesis of APCoAB mentioning that it is an independent program under APAARI with its own SC and a separate budget. Being a neutral forum, it was expected that the various stakeholders in agricultural biotechnology would actively support APCoAB programs. However, except for Mahyco, consistent funding support is not forthcoming from private sector putting its financial condition under strain. He announced that Mahyco had agreed to double the annual contribution to APCoAB from US\$ 5,000 to US\$ 10,000 and APAARI had increased its contribution from US\$ 18,000 to US\$ 28,000.

Dr. Zeigler expressed his pleasure over participating in the SC meeting. He appreciated the importance of a forum like APCoAB in view of current needs to put forth rational and science-based facts about biotechnology to the policy makers and general public. Towards this end IRRI would work with APAARI and APCoAB.

Dr. Ghodake expressed satisfaction at the progress made by APCoAB during recent years with which he was intimately associated as APCoAB Chairman. He was appreciative of the capacity building programs conducted by APCoAB and expressed the need for NARS networking and paying special attention to NARS with limited capacities in biotechnology.

## **2. Adoption of IX Steering Committee Meeting Proceedings**

The proceedings of the ninth SC Meeting were unanimously approved and adopted. The agenda for the tenth SC meeting was also adopted unanimously.

## **3. Action Taken Report**

Dr. Raj Paroda presented the actions taken on the recommendations of ninth SC meeting:

1. Request was sent to Dr. Karesdis Distabanjong, DoA, Thailand who had participated in the IX SC meeting and offered to compile manuscripts on biotechnology success stories from Thailand. In response, Dr. Distabanjong offered following manuscripts available with him for publication:
  - a. Induction of genetic variation for clonal improvement in torch ginger (*Etilingera elatior* (Jack) R.M. Smith) by Chayanit Distabanjong; 15 pages A4 paper size.
  - b. Plant tissue culture in oil palm (*Elaeis guineensis* Jacq) by Chayanit Diatabanjong; 15 pages A4 paper size.
  - c. *In vitro* propagation and conservation of *Rhynchosyilis* spp. by Karsedis Distabanjong; 9 pages A4 paper size.

The SC felt that these would not be suitable for publication as success stories and suggested alternative sources for inviting manuscripts.

2. In response to the request to Dr. P. Ananda Kumar, Project Director, National Research Centre on Plant Biotechnology, New Delhi for organizing a training program for APAARI participants on genetic modification technology, Dr. Ananda Kumar has informed that he would be preparing a program proposal for submission to Indian Council of Agricultural Research in April 2009.
3. With regard to recommendation of the SC to revise the “Status Report on Bt Cotton in India”, it was informed that Dr. Ananda Kumar has formally accepted the offer and the revision was underway.

4. As recommended by the IX SC, 29 middle level biotechnology scientists and managers in NARS members of the region were requested to serve as focal points for providing regular information on national developments in biotechnology so that the same could be widely disseminated through APCoAB website and APAARI newsletter.
5. As a follow-up of the recommendation on developing regional linkages and organizing public awareness meetings, information was provided about the expert consultation on biotechnology organized in Malaysia, the proposal submitted to Monsanto for organizing a policy dialogue on GM technology, and the regional project on tissue culture business platform being developed for submission to FAO. Further details on these initiatives were given during presentation of Progress Report.

#### **4. Recent Progress (March 2008 – August 2008)**

##### **a. Expert Consultation**

##### **Expert Consultation on “Agricultural Biotechnology for Promoting Food Security in Developing Countries”**

APAARI in collaboration with Malaysian Agricultural Research Institute (MARDI) and with partial funding support of GFAR, organized an Expert Consultation entitled “Agricultural Biotechnology for Promoting Food Security in Developing Countries” at Mines Beach Resort, Selangor Darul Ehsan, Malaysia on 20-22 August 2008. Seventy participants, comprising experts on agricultural policy and planning, biotechnology and other academia; civil society and farmer organizations; private sector; and other stakeholder groups attended the Consultation. The participants represented several developing countries of South and Southeast Asia, Near East, Africa and the Pacific, besides international organizations.

The Expert Consultation expressed consensus that biotechnology provides powerful tools to increase and diversify agricultural production. However, there is a need to make wide-ranging reforms in the agricultural production systems to fully address the issues of food security in developing countries. Recommendations on: (i) the role of biotechnology in ensuring food security in the context of its definition as provided by FAO; (ii) regulatory management; (iii) public perception and awareness; and (iv) partnership building, were presented in the Plenary Session. Detailed recommendations are appended as Annexure II.

##### **b. Training Programs**

##### **(i) “Technology for Production and Indexing of Pathogen-Free Citrus Seedlings”, National Taiwan University, Chinese Taipei**

The program organized in collaboration with Council of Agriculture, Chinese Taipei and held at National Taiwan University on 18 – 29 November 2008 was conducted exclusively for APAARI sponsored trainees. Seven APAARI NARS members were invited to send nominations (DoA, Thailand; PARC, Pakistan; BARI, Bangladesh; ICAR, India; AERO, Iran; and MARDI, Malaysia; NARI, PNG) of whom DoA, PARC BARI and MARDI responded with nominations. The training comprised lectures, practical demonstrations and field trips on: 1. Citrus greening and virus diseases; 2. Detection and indexing through bioassay; 3. Biochemical and molecular methods; 4. Shoot-tip Micrografting; and 5. Plantation and health management of pathogen-free seedlings in orchard. List of the participants and the faculty, and the training details are given in Annexure III and IV.

**(ii) “*In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources”, National Bureau of Plant Genetic Resources, New Delhi, India**

This International training program was conducted on 17–29 November 2008 in collaboration with Indian Council of Agricultural Research and Bioversity International. Sixteen trainees from 13 countries including three sponsored by APAARI (CARP, Sri Lanka; Secretariat of Pacific Community, Fiji Islands; Council of Agriculture, Chinese Taipei) participated in the training. The program comprised lectures and on-hand laboratory exercises on: 1. Importance of *in vitro* conservation and cryopreservation techniques; 2. Methods of *in vitro* clonal propagation; 3. Methods of *in vitro* conservation; 4. Cryopreservation principles and prospects; 5. Techniques of cryopreservation; 6. Applications of cryopreservation; 7. Cryobanking of plant germplasm; and 8. Molecular marker techniques for PGR management. Details of the topics and the training program are given in Annexure V.

**(iii) “Molecular Methodologies for Assessing and Applying Genetic Diversity in Crop Plants”, ICRISAT, Hyderabad, India**

The training course organized by ICRISAT, Hyderabad on 17-28 November 2008 accommodated two APAARI nominated trainees (PARC, Pakistan; MARDI, Malaysia, the latter self funded) following circulation of the course advertisement among all APAARI members. The training topics comprised: 1. Introduction to laboratory techniques; 2. Molecular markers (SSRs, SNPs, DArTs); 3. Diversity Array Technology (DArT): Development and applications; 4. Experimental Design: Concepts and Applications; 5. Decision Support System-iMA, iMAS practicals; 6. Molecular diversity: Diversity analysis in populations, Power Marker, Darwin, Introduction to STRUCTURE analysis; 7. Phenotyping, 8. Molecular breeding; 9. Application of molecular markers in public sector; and 10. LD mapping and TASSEL software for association mapping.

**(iv) “Introductory course in Bioinformatics”, Agricultural Genetic Engineering Research Institute, Egypt**

The training program was organized by Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA) with funding support of GFAR and held at AGERI, Egypt on 23 November–2 December 2009. Invitations were sent to all APAARI members to nominate trainees to be selected on competitive basis by AGERI. Of the 14 selected trainees from developing countries of Asia-Pacific, four (from Pakistan, Nepal, Iran and Sri Lanka), were APAARI nominees. The topics of training comprised: 1. Information databases; 2. Sequence alignment; 3. Sequence similarity search; 4. Multiple sequence alignment; 5. Structural bioinformatics; and 6. Functional genomics.

**c. Publications**

**(i) Publication entitled “Production and Cultivation of Virus-Free Citrus Saplings for Citrus Rehabilitation in Taiwan”**

This publication details the methodologies for diagnosis and indexing of four important diseases of citrus: Citrus greening, Citrus tristeza, Citrus tatter leaf and Citrus exocortis. Techniques of Shoot Tip Micrografting along with establishment of pathogen-free foundation block have been provided. The final chapter deals with the health management of citrus seedlings in the field.

**(ii) Publication entitled “Proceedings of the Expert Consultation on Agricultural Biotechnology for Promoting Food Security in Developing Countries”**

A joint publication of APAARI and MARDI, the proceedings includes chapters: 1. Rationale and Objective of Expert Consultation; 2. Opening Session; 3. Session IA: Status of Agricultural Biotechnology Research and Application–Global Developments; 4. Session IB: Status of Agricultural Biotechnology Research and Application– Country Reports; 5. Session II: Technical Sessions: Biotechnology Applications; 6. Session III: Global and Regional Partnerships in Agricultural Biotechnology; 7. Session IV: Issues in Adoption and Commercialization of Agricultural Biotechnology– Panel Discussion, 8. Breakout Group Discussion and Recommendations on Addressing Issues through Country and Regional Initiatives; and 9. Session VI: Plenary Session– Group Recommendations and General Recommendations.

The above publications were distributed among all the APAARI members and stakeholders around the globe. These are also available on APCoAB website for free downloading.

**d. Web-based information dissemination**

APCoAB website is being updated on a regular basis with news on global developments in agricultural biotechnology with particular reference to Asia-Pacific region.

**e. Other activities**

**(i) Organization of policy dialogue on “GM Technology from Increasing Agricultural Productivity in Asia”**

The SC was apprised of the concept note submitted to Monsanto for support the organization of a policy dialogue on “GM Technology from Increasing Agricultural Productivity in Asia”. it is proposed to seek co-sponsorship of FAO, CGIAR etc. after receiving response to from Monsanto,

**(ii) Regional project on Tissue Culture Business Platform in Asia**

APCoAB at the initiative of FAO has prepared a concept note for establishing a regional tissue culture propagation material based business platform. The objective is to provide forum for a regional collaboration to boost production, exchange and delivery of high quality planting materials and low-cost biotechnology products to smallholder farmers. APCoAB/APAARI is proposed to coordinate activities involving Council of Agricultural Research Policy, Sri Lanka; Bangladesh Agricultural Research Council, Bangladesh; Nepal Agricultural Research Council, Nepal; and Department of Agriculture, Thailand.

**5. Work Plan for 2009**

Following work plan for 2009 was approved:

**(a) Publications:**

Success Stories:

- Banana Tissue Culture
- Bt Cotton in China
- Bt Cotton in India (revised edition)

**(b) Website Development:**

A regular updating of (i) News and Events, and (ii) Agricultural Biotechnology Institutions in the Asia-Pacific region.

**(c) Meetings:**

APCoAB Steering Committee Meeting 30 January, Bangkok;  
During 26 to 28 October,  
Chinese Taipei

**(d) Expert Consultations:**

“Biopesticides and Biofertilizers for Sustainable Agriculture”. 26 – 28 October,  
Chinese Taipei

**(e) Capacity Building:**

(i) Training Course on “Rapid Bioassay for Pesticide Residues on Fruits and Vegetables for Market Inspection and Farm Education”, to be held in Chinese Taipei.

(ii) Training Course on “Biotechnology Tools for Plant Genetic Resources Conservation”, to be held at National Bureau of Plant Genetic Resources, New Delhi.

**(f) Production of CD on Agricultural Biotechnology Institutions of Asia-Pacific Countries**

**6. Audited Account and Budget 2009**

The audited accounts statement for January-December 2008 were presented for examination and the same was approved unanimously (Annexure VI). Budget for 2009 was submitted and the same approved after discussion (Annexures VII, VIII). Dr. Ghodake mentioned about the need to attach Auditor’s letter with the statement. It was clarified by the Secretariat that the letter is regularly obtained and the same will be circulated to all members, as soon as it is made available.

**7. General Discussion and Recommendations**

Following the presentation of Action Taken Report and Recent Progress, the Chairman invited comments from the participants.

The SC put on record its appreciation of Mahyco for doubling its contribution to APCoAB.

Dr. Robert Zeigler expressed his appreciation of the activities of APCoAB. He assured to follow-up on his recent discussion with Dr. Paroda regarding collaborating with APAARI on the proposed policy dialogue on GM crops and a meeting on facilitating release of crop varieties bred for single traits through marker assisted selection. With respect to the proposed policy dialogue, he suggested emphasis on public awareness and communication issues in order to deliver the much needed authentic and science-based information to public.

Dr. Abd. Shakur welcomed the policy of APCoAB to project and promote not only GM technology but also tissue culture, and marker-assisted breeding as equally important applications of biotechnology. He made mention of biosensors and molecular detection technologies in which MARDI has developed special expertise.

Mr. Malcolm Hazelman supported the proposal for holding policy dialogue on GM technology and agreed to pursue for participation of FAO in the program. He informed that a substantial information has become available under the FAO project on biosafety and suggested APARIS to compile this information dissemination as a web-based resource.

During the discussion on raising resources, Dr. Ghodake mentioned that APCoAB could offer consultancy services to member NARS on their specific requirements for adoption and promotion of biotechnology. Dr. Shukor suggested that biotechnology experts from member NARS could offer services for APCoAB awareness and capacity building programs with the costs borne by NARS institutions.

All the members of SC expressed appreciation of CoA, Chinese Taipei for funding support to APAARI/APCoAB and hosting the training program at National Taiwan University also bearing the full training and stay costs.

Dr. Paroda and Dr. Ghodake suggested CoA to raise the funding support to US\$ 100,000 per year and fund the programme for another cycle of three years. Dr. Liu agreed to convey the suggestions of SC to the concerned authorities in CoA.

Dr. Anil Bawa while appreciating the efforts of APCoAB in promoting agricultural biotechnology suggested more emphasis on animal biotechnology component since animal resources comprising farm animals, poultry, fish and other animal resources are important components is an important components of agriculture in the Asia-Pacific region.

The following specific recommendations were made:

1. The SC expressed satisfaction at the very good progress made during the period under report particularly appreciating the efforts made towards capacity building.
2. The work plan for 2009 was approved.
3. The core funding of APCoAB from APAARI was raised to US\$ 18,000 per year. In the budget estimates for 2009, it was recommended to raise the allocation under the head Consultancy to US\$ 50,000.
4. It was recommended to request ICAR to support training programs conducted in ICAR institutes by waiving the fee or providing a lump sum grant for organizing the trainings.
5. It was agreed to organize the Expert Consultation on “Biopesticides and Biofertilizers for Sustainable Agriculture” in Chinese Taipei on 26 – 28 October 2009 back to back with XI APCoAB SC meeting.
6. Attempts should be made to involve ADB, SARC, ASEAN, Malaysian Biotech Corporation in APCoAB activities and also get associated with their biotechnology programs.
7. The support of FAO-RAP should be taken in piloting the project on Tissue Culture Business Platform.
8. **Any other business:** Nil



## **9. Closing the meeting:**

On completion of all the agenda items, the Chairman expressed his thanks to all the members for attending the meeting and active participation in the proceedings. Dr. Anil Bawa, who served as Co-Chair expressed similar sentiments and thanked ICAR and APAARI for his nomination to the meeting. Both the Chair and CO-Chair complimented Executive Secretary, APAARI; Coordinator, APCoAB; and all the support staff for excellent progress despite several handicaps. The Executive Secretary thanked all the committee members, APAARI members and other supporters of APAARI and APCoAB for reposing confidence in the organizations.

The meeting ended with a vote of thanks to the chair.



## X STEERING COMMITTEE

30 January 2009

### LIST OF PARTICIPANTS

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**General Recommendations of the Expert Consultation on Agricultural Biotechnology for Food Security in Developing Countries**

**(i) Strengthening biotechnology for agricultural development and diversification to ensure food security and increase profitability of farmers**

- Experiences in several countries including India, China and the Philippines where adoption of GM crops has resulted in increased crop yields and higher net profits to farmers indicate the potential of biotechnology in meeting the goals of food security. Other countries need to adopt appropriate policies and strategies to encourage adoption of biotechnology in agriculture.
- There is a need to adopt appropriate biotechnological tools (GM technology, marker-aided-selection, genomics, micropropagation, diagnostics) to address specific scientific issues related to crop improvement and diversification. The objective should be to increase productivity in conventional crops as also help in crop diversification by developing varieties having biotic and abiotic stress resistance that can be grown on marginal lands.
- Emphasis should be placed on improving nutritional quality of food crops, being an important component of food security. As exemplified by Golden Rice, biotechnology has an important role in achieving this objective.
- Biotechnology provides opportunities to develop alternatives to food crops for biofuel production. Non-food crops like cellulosic grasses and microalgae need biotechnological interventions to render their use for biofuel production economically viable.

**(ii) Facilitating regulatory management**

- Regulatory issues impact adoption, commercialization and transboundary movement of GM crops and products. Hence, facilitating regulatory management would help in rapid dissemination of useful products to meet agriculture and food security needs across countries. Three specific recommendations to facilitate regulatory management were made:
  - Build confidence in GM technology which will facilitate a more open and acceptable regulatory system.
  - Simplify regulatory norms for GM food crops and traits of apparently limited environmental and human risk.
  - Facilitate transboundary movement of GM food crops through bilateral or regional agreements on biosafety information requirement and acceptance.

**(iii) Strengthen linkages**

**South-South Linkages**

- South-South linkages will help in promoting agricultural biotechnology among developing countries and bridge regional and interregional gaps. There is a need to exchange information, germplasm and technologies through South-South collaborations. This can be done through:
  - Conducting workshops and defining the available resources and needs, followed by mutually agreed action plans.
  - The existing fora such as APAARI, FARA, AARINENA and other networks already functional within these platforms can play a major role in facilitating South-South interaction.

**North-South linkages**

- The genetic resources are abundant in countries of the South while the tools and technologies are available in north. North-South linkages for germplasm, technology, products and information exchange will be of mutual benefit and help the developing countries to accelerate the pace of biotechnology adoption.

#### **Public-Private linkages**

- The strengths of public and private sectors are mutually complementary. There is a need for the two to work together with mutual trust and commitment to create a dynamic and result oriented working environment.

#### **(iv) Creating awareness by improving communication**

- Train young scientists as communicators, not just in the field of biotechnology but also on issues of agriculture, food security and environmental safety.
- APAARI should initiate organization of meetings/workshops with the policy makers in the Asia-Pacific region on food security, biotechnology and regulatory management issues.
- Arrange discussions between scientist, CSOs, farmer organizations and consumer groups to foster understanding and cooperation between all stakeholders.
- Develop farmer-scientist linkages and cooperation through conducting field visits, seminars etc.
- Set up scientific academia and communication units at the national level to assist in awareness creation.

#### **(v) Creating awareness through education**

- Include biotechnology in school syllabi providing factual information about its usefulness and safety aspects. APAARI may come up with a strategic plan to introduce such a program in schools.
- Develop educational tools including websites on GM technology, safety of GM crops, IP and regulatory systems.

#### **(vi) Capacity building**

- Need to strengthen capacity in developing countries especially in the area of scientific risk assessment and management and on IP issues.
- Collaborate in regional and interregional capacity building through support of NARS, CG centers and fora like APAARI, FARA and AARINENA.
- Need to raise funding for capacity building through international bodies such as the ACP (African Caribbean Pacific group of states), APEC, Royal Science Society and also private sector (major multinational companies).

**Training program “Technology for Production and Indexing of Pathogen-Free Citrus Seedlings”  
National Taiwan University, Taipei**

**List of trainees and faculty**

<b>Trainees</b>	
Ms. Kogeethavani Kogeethavan A/P Ramachandran Pest and Disease Management Programme, Horticulture Research Centre, Kluang MARDI Station, Malaysia	Mr. Sitthisak Saepaisal Plant Protection Division Department of Agricultural Bangkok, Thailand
Mr. Abdul Rehman Asstt. Scientific Officer, Citrus Research Institute, Pakistan	Dr. Proshanta Kumar Sardar Senior Scientific Officer, Citrus Research Station, Bangladesh Agricultural Research Institute (BARI), Jaintapur, Sylhet, Bangladesh

<b>Faculty</b>	
Prof. Hong-Ji Su Department of Plant Pathology & Microbiology, National Taiwan University, Taiwan	Prof. Ting-Hsuan Hung Department of Plant Pathology & Microbiology, National Taiwan University, Taiwan
Ms. Ya-Chih Feng Department of Plant Pathology & Microbiology, National Taiwan University, Taiwan	Ms. Yi-Shia Lee Department of Plant Pathology & Microbiology, National Taiwan University, Taiwan
Mr. Ting-Lin Chi Department of Plant Pathology & Microbiology, National Taiwan University, Taiwan	Dr. J. L. Karihaloo Coordinator, Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), APAARI, NASC Complex, DPS Marg, New Delhi 110012, India

## ANNEXURE IV

### Training program “Technology for Production and Indexing of Pathogen-Free Citrus Seedlings” National Taiwan University, Taipei

#### Training schedule

Date and time			Program	Lecturer /assistant
18 (Tue)	AM	09:00-10:00	Registration and orientation	Prof. Chen, Su and Hung
		10:10-12:00	I . Citrus greening and virus diseases	Prof. Su / Ms. Feng, Mr. Chi
	PM	13:30-17:00	III-(1) Cultivation of etiolated seedling / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
19 (Wed)	AM	09:00-12:00	III-(2) Shoot Tip Micrografting (STG) / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
	PM	13:30-17:00	III-(2) STG / <u>exercise</u>	Prof. Su / Ms. Fu, Mr. Chi
20 (Thu)	AM	09:00-12:00	Courtesy call to Internal Affairs Department, Council of Agriculture	Prof. Su, Hong
	PM	13:30-17:00	IV. PF citrus foundation and nursery system and rapid propagation of pathogen-free (PF) citrus seedling	Prof. Su / Mr. Chi
21 (Fri)	AM & PM		Trip by rapid rail to Chiayi Experimental Station for observation of PF-citrus foundation and citrus orchards	Prof. Su and Hung
22 (Sat)	AM	09:00-12:00	III-(3) Double grafting of STG-scion / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
	PM	13:30-17:00	III-(2) STG / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
23 (Sun)			Free	
24 (Mon)	AM	09:00-12:00	II -(1) PCR detection of Huanglongbing (HLB) / <u>exercise</u>	Prof. Hung / Ms. Lee,
	PM	13:30-17:00	II -(1) PCR detection of HLB / <u>exercise</u>	Prof. Hung / Ms. Lee,
25 (Tue)	AM	09:00-12:00	II -(2) Rapid diagnosis of HLB by Iodine Kit / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
	PM	13:30-17:00	II -(6) Bioassay of HLB and viruses / <u>exercise</u>	Prof. Su / Ms. Feng, Mr. Chi
26 (Wed)	AM	09:00-12:00	II -(4) + II -(5) RT-PCR detection of <i>Citrus tatter leaf capillovirus</i> (CTLV)	Prof. Hung / Ms. Lee,
	PM	13:30-17:00	II -(4) + II -(5) / <u>exercise</u>	Prof. Hung / Ms. Lee,
27 (Thu)	AM	09:00-12:00	II -(3) ELISA and rapid diagnostic strip for detecting <i>Citrus tristeza closterovirus</i> (CTV) / <u>exercise</u>	Prof. Su / Ms. Fu, Mr. Chi
	PM	13:30-17:00	II -(3) ELISA / <u>exercise</u>	Prof. Su / Mr. Chi
28 (Fri)	AM	09:00-12:00	V . Plantation and health management of PF-citrus seedlings in orchard	Prof. Su, Hung / Ms. Feng, Ms. Fu, Mr. Chi
	PM	13:30-17:00	Final discussion	
29 (Sat)	AM		Departure	

ANNEXURE V

**“International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources”**  
National Bureau of Plant Genetic Resources, New Delhi

**Training schedule**

<b>Date</b>	<b>Time</b>	<b>Activity</b>	<b>Speaker/Contact person</b>
17.11.08 (Monday)	9.00 – 9.30 AM	Reception and registration of trainees	Rekha Chaudhury and Ruchira Pandey
	9.30 – 10.30 AM	Inaugural Function	
	10.30 AM–12.00 noon	Interactive session of trainees with faculty	Rekha Chaudhury
	12.00 noon –1.00 PM	<i>Lecture 1</i> : Role of NBPGR in Management of Plant Genetic Resources	S.K. Sharma
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 - 2.30 PM	<i>Lecture 2</i> : Enhancing agricultural biodiversity management and utilization through biotechnology	Leocadio S. Sebastian
	2.30 –3.00 PM	<i>Lecture 3</i> : Asia-Pacific Consortium on Agricultural Biotechnology – Supporting biotechnology application in developing countries	J.L. Karihaloo
	3.00 – 3.15 PM	<b>Tea</b>	
	3.15 – 4.30 PM	Visit to various laboratories of NBPGR (Museum, Genebank, PQD, Containment facility)	S.K. Malik and Sunil Archak
18.11.08 (Tuesday)	9.45 – 10.30 AM	<i>Lecture 4</i> : <i>In vitro</i> conservation of germplasm : Methodology and achievements.	R.K. Tyagi
	10.30-11.15 AM	<i>Lecture 5</i> : Basic principles and techniques of plant cryopreservation	Rekha Chaudhury
	11.15 – 11.30 AM	<b>Tea</b>	
	11.30 AM – 1.00 PM	<i>Practical 1</i> : Techniques for long-term conservation of non-orthodox seeds and embryonic axes	Rekha Chaudhury and Anang Pal
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	<i>Practical 1</i> : continued	
	3.15 – 3.30 PM	<b>Tea</b>	
19.11.08 (Wednesday)	9.45 – 10.45 AM	<i>Lecture 6</i> : Cryobanking of non-orthodox seeds, pollen, and dormant buds – Achievements and practical considerations	S.K. Malik
	10.45 -11.30 AM	<i>Practical 2</i> : Desiccation and step-wise freezing methods for cryopreservation of pollen and dormant buds	S.K. Malik and Satyaprakash
	11.30 – 11.45 AM	<b>Tea</b>	
	11.45 AM –1.00 PM	<i>Practical 2</i> : continued	S.K. Malik and Satyaprakash
	1.00 – 2.00 PM	<b>Lunch</b>	

	2.00 – 3.15 PM	<i>Practical 2</i> : continued	S.K. Malik and Satyaprakash
	3.15 – 3.30 PM	<b>Tea</b>	
	3.30-4.30 PM	Presentation by Trainees (4)	S.K. Malik
20.11.08 (Thursday)	9.45 – 10.30 AM	<i>Lecture 7</i> : Practical considerations in managing the multi-crop <i>in vitro</i> genebank at NBPGR	R.K. Tyagi
	10.30 - 11.15 A.M	<i>Lecture 8</i> : Methods in cryopreservation of <i>in vitro</i> culture systems	Ruchira Pandey
	11.15 -11.30 A.M	<b>Tea</b>	
	11.30 –1.00 PM	<i>Practical 3a</i> : Cryoprotectant solutions and pretreatment media for cryopreservation	Ruchira Pandey and R.P. Yadav
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	<i>Practical 3b</i> : Demonstration of cryopreservation in garlic	Ruchira Pandey and R.P. Yadav
	3.00 – 3.15 PM	<b>Tea</b>	
21.11.08 (Friday)	9.45 – 10.30 AM	<i>Lecture 9</i> : Case studies related to <i>in vitro</i> conservation and cryopreservation of tropical and medicinal plants	Neelam Sharma
	10.45-11.30 AM	<i>Lecture 10</i> : Role of <i>in vitro</i> and cryopreservation techniques in facilitating germplasm exchange	Anuradha Agrawal
	11.15 – 11.30 AM	<b>Tea</b>	
	10.45 –1.00 PM	<i>Practical 4</i> : Vitricification techniques used in cryopreservation of <i>in vitro</i> explants	Neelam Sharma and Ramesh Chamola
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	<i>Practical 4</i> : continued	
	3.00 – 3.15 PM	<b>Tea</b>	
22.11.08 (Saturday)	9.45 – 10.30 AM	<i>Lecture 11</i> : Case studies related to <i>in vitro</i> conservation and cryopreservation in temperate crops	Sandhya Gupta
	10.30 –11.30 AM	<i>Lecture 12</i> : Molecular markers : An overview	K.V. Bhat
	11.30 – 11.45 AM	<b>Tea</b>	
	11.45 –1.00 PM	<i>Practical 5</i> : Encapsulation-dehydration techniques for cryopreservation of <i>in vitro</i> explants	Sandhya Gupta and Hardev Prasad
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 3.30 PM	<i>Practical 5</i> : continued	
	3.30 – 3.45 PM	<b>Tea</b>	
	3.45 - 4.30 PM	Presentation by Trainees (4)	Neelam Sharma
23.11.08 (Sunday)	<b>HOLIDAY</b>		
24.11.08 (Monday)	9.30 – 10.30 AM	<i>Practical 6</i> : PCR based techniques for characterization of germplasm	K.V. Bhat, A.B. Gaikwad, Sunil Archak



	10.30 - 11.15 AM	<i>Lecture 13</i> : DNA markers for characterization of PGR	A.B. Gaikwad
	11.15 – 11.30 AM	<b>Tea</b>	
	11.30 AM – 1.00 PM	Interactive session with Dr. R.S. Paroda	
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 2.45 PM	<i>Practical 6</i> : continued	
	2.45 – 3.00 PM	<b>Tea</b>	
	3.00 - 4.30 PM	<i>Practical 6</i> : continued	
25.11.07 (Tuesday)	9.30 – 11.15 A.M	<i>Practical 6</i> : continued	K.V. Bhat, A.B. Gaikwad, Sunil Archak
	11.15 – 11.30 AM	<b>Tea</b>	
	11.30 AM–12.15 PM	<i>Lecture 14</i> : <i>In vitro</i> cryopreservation of <i>Musa</i> germplasm at the INIBAP Transit Center, Leuven	Bart Panis
	12.15 –1.00 PM	<i>Practical 7</i> : Meristem isolation in <i>Musa</i>	Anuradha Agrawal and Bart Panis
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	<i>Practical 8</i> : Cryopreservation in <i>Musa</i>	Bart Panis and Anuradha Agrawal
	3.00 – 3.15 PM	<b>Tea</b>	
26.11.08 (Wednesday)	9.45 – 10.45 AM	<i>Lecture 15</i> : Applications of cryopreservation (also virus eradication, preservation of transformation competent cells)	Bart Panis
	10.45 - 11.30 AM	<i>Lecture 16</i> : Case studies related to monitoring genetic stability of <i>in-vitro</i> conserved and cryopreserved germplasm	Zakir Hussain
	11.30 – 11.45 AM	<b>Tea</b>	
	11.45 – 1.00 AM	<i>Lecture 17</i> : Application of DNA markers for genetic diversity	Sunil Archak
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	Visit to Phytotron Facility, IARI and Agriculture Science Museum	Sunil Archak
27.11.08 (Thursday)	9.45 – 10.30 AM	Presentation by Trainees (4)	Rekha Chaudhury
	10.30 – 10.45 AM	<b>Tea</b>	
	10.45 –1.00 PM	<i>Practical 10</i> : Isozyme analysis of <i>in vitro</i> -conserved germplasm	Zakir Hussain and Devender Nerwal
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 4.30 PM	<i>Practical 10</i> : Continued	
	3.00 – 3.15 PM	<b>Tea</b>	
28.11.08 (Friday)	9.45-10.45	Presentation by trainees (4)	Anuradha Agrawal
	10.45 – 11.45 AM	Visit to Bioversity International and APCoAB	S.K. Malik
	11.45 – 1.00 PM.	Feedback session	Rekha Chaudhury and K.V. Bhat
	1.00 – 2.00 PM	<b>Lunch</b>	
	2.00 – 3.00 PM	Valedictory function	

29.11.08 (Saturday)	Education Trip
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**SUMMARY ACCOUNT STATEMENT OF APCoAB**  
**01 January – 31 December 2008**  
 (Amount in US Dollars)

ITEMS	RECEIVED	DISBURSEMENTS		BALANCE
		Budget	Actual Used	
<b>Amount B/F</b>				<b>36,744.29</b>
1. Contributions (COA, ACIAR , APAARI and Mahyco)	87,676.43			
2. Interest Income	373.75			
3. Other Income:	-			
3.1 Refund	-			
4. Secretariat Support:				
4.1 Office Stationery & Office equipment		10,000.00	3,892.58	
4.2 Miscellaneous / Communication			2,713.35	
5. Publications		10,000.00	6,262.57	
6. Consultancy , Salary of Assistant		40,000.00	48,058.50	
7. Travel		10,000.00	4,021.11	
8. Training		20,000.00	-	
9. Meetings		20,000.00	-	
9.1 Expenses of Steering Com/General/High Level Meetings			37,051.60	
<b>TOTAL</b>	<b>88,050.18</b>	<b>110,000.00</b>	<b>101,999.71</b>	
				<b>22,794.76</b>

Remark: Expenditure on behalf of APAARI US\$ 2,124.71


Total amount in BKK office:

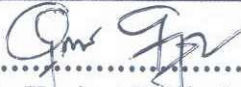
US\$ 3,962.64


Total amount in New Delhi office:

US\$ 16,707.41

<b>Grand Total:</b>	<b>US\$ 20,670.05</b>
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 .....27/11/09.  
**Dr. Raj Paroda**  
 Executive Secretary, APAARI

  
 .....  
**Ms. Urairat Rujirek**  
 Accountant, APAARI

  
 .....  
**Mr. Rattanachai Dumnernsawat**  
 External Auditor

**CONTRIBUTIONS DURING 2008**

<b>S.No.</b>	<b>Particulars</b>	<b>Amount (US\$)</b>
1.	Balance 2007	36,744.29
2.	Interest on income	373.75
3.	Contributors	
3.1	APAARI	18,000.00
3.2	ACIAR	12,000.00
3.3	Mahyco	5,126.43
3.4	CoA, Taipei	35,000.00
3.5	GFAR	17,550.00
	Total	87,676.43
	<b>Grand Total</b>	<b>1,24,794.47</b>

**ANNEXURE VIII****ESTIMATED BUDGET FOR 01 JANUARY – 31 DECEMBER, 2009**

<b>1.</b>	<b>Balance on 31.12.2008</b>	<b>22,794.76</b>
<b>2.</b>	<b>Refund due from APAARI</b>	<b>2,124.71</b>
	Total available amount on 31.12.2008	24,919.47
<b>3.</b>	<b>Expected Contributions 2009</b>	
3.1	APAARI	28,000.00
3.2	ACIAR	12,000.00
3.3	Mahyco	10,000.00
3.4	CoA, Taipei	35,000.00
3.5	GFAR Balance	4,270.00
3.6	FAO (2008 Publications)	7,500.00
	Total	96,770.00
	<b>A. Grand Total (1+2+3)</b>	<b>1,21,689.47</b>
<b>4.</b>	<b>Estimated Expenditure for 2009</b>	
4.1	Consultancy	50,000.00
4.2	Secretarial Support & Misc.	15,000.00
4.3	Publications	10,000.00
4.4	Travel	10,000.00
4.5	Training	20,000.00
4.6	Meetings (Steering Committee, Expert Consultancy)	5,000.00
	<b>B. Total (3)</b>	<b>1,10,000.00</b>
	<b>Expected Balance (A – B) as on 31.12.2009</b>	<b>11,689.47</b>