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Report on:

**Project XP/RAS/94/135 - Application of Mushroom Biotechnology and Bioconversion
for Sustainable Small Industries Development in Developing Countries-
UNIDO Contract No. 95/031
International Symposium on "Development of Small and Medium Enterprises for
Biotechnology Commercialization in Developing Countries"**

1. **Title:** Sponsorship of potential Resource Center Managers in Asian LDCs to the International Symposium on "Development of Small and Medium Enterprises for Biotechnology Commercialization in Developing Countries"
2. **Date:** 24-28 July 1995
3. **Venue:** Heritage Hotel, Roxas Blvd., Manila, Philippines
4. **Objectives:**
 - To identify market potentials and business opportunities from recent developments in biotechnologies which are consistent with developing country needs and aspirations.
 - To formulate effective strategies in development-cooperation and technology transfer for facilitating the biotechnology commercialization process.
5. **Target Participants for UNIDO Sponsorship:**

The participants that were selected for UNIDO sponsorship were identified potential Resource Center Managers coming from Asian Least Developed Countries (LDCs).

6. **Brief Description of Program:**

The Symposium Program consisted of:

- Paper presentations and poster/product exhibition under three main themes. (A) recent developments and experiences in biotechnology transfer and commercialization, (B) Policy, financial, legal and bio-safety issues, and (C) Assessment of future biotechnology options, commercialization prospects and other related issues.
- Small group discussions on the papers presented under each theme and plenary presentation of the discussion results.
- A special forum for potential investors and entrepreneurs on selected biotechnologies which are ready or already being commercialized.

The complete Symposium Program is found in Annex I.

7. **Participation:**

The Symposium was very well attended with a total of 226 participants that came from various developing countries as well as from the host country. Among these participants, the following selected potential resource center managers were sponsored through the UNIDO contract:

1. HOPPER, Shantha Kumar M. S. Swaminathan Research Foundation
111 Cross St. Taramani Inst. Area
Taramani, Madras-600113, India
2. PHAN, Huy Duc University of Hanoi - Vietnam
Faculty of Biology
90 Nguyen Thrai St. Hanoi, Vietnam
3. RAHMAN, Habibur Technomushroom Farm, D.M.C.
725 North Karful
Dhaka 1206, Bangladesh
4. RODPAI, Nimit Rujira Mushroom Farm
138 Mu 10 KangDong
Kalasin, Thailand
5. SUTARTO, Herry Agency for Cooperatives & Small Enterprises
R&D, JL. Letjen Haryond MT
Jakarta 12770, Indonesia
6. SHRESTHA, Gyan Green Energy-Nepal
Ghatte Kulo, Anaam Nagar, Kathmandu
Nepal P.O. Box 10647
7. THAITATGOON, Satit Arunyik Mushroom Center
P.O. Box 1 Nongkhaem
Bangkok 10162, Thailand
8. VIEN, Pham Vinh Km. 8 Nguen Trai Hanoi
Vietnam

8. **Actual Costs Incurred:**

Total Budget:	\$ 10,000.00
Actual Expenses Incurred:	\$ 10,034.26
Advance Received from UNIDO:	\$ 8,000.00
Outstanding Balance:	\$ 2,034.26

Details of expenses are given in Annex 2.

9. **Assessment of:**

Degree of Reaching the Target Group: The target group was on the whole largely covered with selected potential resource center managers coming from Bangladesh, Nepal, Vietnam, Indonesia and India. However two pre-identified participants coming from Nepal and Bhutan were not able to participate due to problems in arranging for their travel to Manila, which was mainly caused by the difficulty and reliability of communications. Thus, two excellent mushroom growers from Thailand were sponsored in place of the two who were not able to go.

Degree of Meeting Objectives: The main objectives of the Symposium were well met, as it served as a very good forum for presenting relevant biotechnologies which are suitable for developing countries, while the small group discussions generated ideas for encouraging development-cooperation and facilitating bioechnology transfer and commercialization. For the UNIDO-sponsored participants, in particular, the Symposium has provided them an excellent chance for networking with colleagues from other developing countries and more importantly, getting new ideas for pushing biotechnology commercialization in their own countries.

10. **Assessment by Participants:**

On the whole the Symposium was well appreciated by the participants, as 85.5% indicated that their knowledge has been enriched while 93.4% thought that their expectations were met. Furthermore, 87.6% judged that the symposium objectives were realized while 90.8% felt that the symposium was quite well organized.

11. **Conclusions:**

The UNIDO Contract: 95/031 has been satisfactorily fulfilled as the selection and participation of 8 potential resource center managers from the Asian developing countries of Bangladesh, India, Indonesia, Nepal, Thailand and Vietnam to the Biotech Commercialization Symposium in Manila were successfully facilitated. Participants were satisfied with the outcome of the Symposium and indicated that the objectives have been met and that on the whole the activity had been well organized. The UNIDO sponsored participants in particular, benefitted from the exposure in terms of increased knowledge and more importantly from increased opportunities for networking and cooperation. It is now up to UNIDO, to come up with follow-up activities to develop and sustain these initial effort and results.

**International Symposium on: Development of Small and Medium Enterprises for
Biotechnology Commercialization in Developing Countries
24-28 July 1995, Heritage Hotel, Manila, Philippines**

Program of Activities

Day 1, 24 July 1995

Morning Session

7:00	-	8:00	Registration	
8:00	-	10:00	Opening Ceremonies	
			Invocation	
			German National Anthem	
			Welcome Address	Mrs. Carmencita Abella President Development Academy of the Philippines
			Introductory Statement	Dr. Guenter Tharun Head Carl Duisberg Gesellschaft - South East Asia Program Office
			Introduction of the Keynote Speaker	Dr. William Padolina [*] Secretary Department of Science and Technology
			Keynote Address	Sec. Rizalino Navarro Secretary Department of Trade and Industry
10:00	-	10:30	Opening of the Product, Equipment and Poster Exhibition	
			Coffee Break	
10:30	-	12:00	Symposium Proper	
			Technical Keynote Addresses	
			"The Emerging Role of Management in Developing Countries"	Prof. Nawaz Sharif School of Management Asian Institute of Technology, Thailand
			"Biotechnology Commercialization"	Dr. William Padolina [*] Secretary Department of Science and Technology
12:00	-	1:00	Lunch Break	

^{*} Dr. Padolina's speech was read by Dr. Ancog, Undersecretary of the Dept. of Science and Technology

Afternoon Session

THEME A: Recent Developments and Experiences in Biotechnology Transfer and Commercialization

Moderator: Dr. Amaret Bhumiratana

Rapporteur: Dr. Emerlito Borromeo

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|-------------|--|--|
| 1:00 - 1:40 | Dr. Guenter Tharun
Thailand | "From Labs to Lips: Factors of Successful Commercialization of Biotechnology in Rural Areas" |
| 1:40 - 2:20 | Dr. K. V. Raman
U.S.A. | "The Role of ISAAA in Biotechnology Transfer and Commercialization in Developing Countries" |
| 2:20 - 3:00 | Dr. Robert Yuan
U.S.A. | "Technology Transfer to Developing Countries through Government Sponsorship of Commercial Agreements" |
| 3:00 - 3:30 | Coffee Break | |
| 3:30 - 3:50 | Dr. Janos Hollo
Hungary | "Results and Experience in Realizing the Central Biotechnology Program in Hungary" |
| 3:50 - 4:10 | Dr. Vo Thi Hahn
Vietnam | "Commercialization of Biotechnology in Vietnam through Small Enterprises" |
| 4:10 - 4:30 | Dr. Frantisek Zadrazil
Germany | "Utilization of Plant Residues for Production of Edible Mushrooms and Animal Feed in Small Industry of Developing Countries" |
| 4:30 - 4:50 | Dr. Siddig Hussein Hamad
Sudan | "The Commercialization of Kiswa Production in Sudan" |
| 7:00 - 9:00 | Dinner Reception and Cultural Presentation | |

Day 2, 25 July 1995

Morning Session

Moderator: Dr. K.V. Raman

Rapporteur: Ms. Nirianne Palacpac

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|---------------|------------------------------------|---|
| 8:00 - 8:40 | Dr. Madhup Dhungana
Nepal | "ANSAB's Experiences with Cooperation for Biotechnology Application and Commercialization" |
| 8:40 - 9:20 | Dr. Amaret Bhumiratana
Thailand | "Exploitation of Biotechnological Techniques for Improvement of Soy Sauce Manufacturing Capabilities of Small Factories in Thailand" |
| 9:20 - 10:00 | Ms. Judith Chambers
U.S.A. | "The Agricultural Biotechnology for Sustainable Productivity Project (ABSP): The US Agency for International Development's Support for Commercial Ag-Biotech in Emerging Nations" |
| 10:00 - 10:30 | Coffee Break | |

10:30 - 11:10	Dr. R. B. Singh India	"Commercialization of Biotechnology in India"
11:10 - 11:30	Dr. Emerlito Borromeo Philippines	"Transfer and Promotion of Mushroom Biotechnology in the Philippines"
11:30 - 11:50	Dr. Jose Luis Ibanez Mexico	" <i>Rhodococcus fascians</i> Metabolites with Surface Active Properties"
11:50 - 1:00	Lunch	

Afternoon Session

Moderator: Dr. Madhup Dhungana
Rapporteur: Dr. Fidel R. Nayve Jr.

1:00 - 1:40	Dr. Ramunas Bigelis U.S.A.	"Classical and Recombinant Approaches to Production and Food Processing Enzymes and organic Acids by Fermentation"
1:40 - 2:20	Dr. Nantakorn Boonkerd Thailand	"Commercialization of Biological Nitrogen Fixation in the ASEAN Region"
2:20 - 3:00	Ms. Niranne Palacpac Philippines	"Experiences in Training and Technology Transfer of Bio-organic Fertilizers for Small Farmers and Entrepreneurs"
3:00 - 3:30	Coffee Break	
3:30 - 4:10	Dr. Shanta Kumar Hopper India	"Applications of Biotechnology for the Rural Poor - Biovillages in pondicherry, An Experiment"
4:10 - 4:30	Dr. M. Gul Hossain Bangladesh	"Biotechnology in Bangladesh: Orphans in Prison Cells"
4:30 - 4:50	Dr. Ruslan Abdullah Malaysia	"Clonal Palm (<i>Elucis guineensis</i>) Replacing Seeds as Planting Materials"

Day 3, 26 July 1995

Morning Session

Moderator: Dr. Robert Yuan
Rapporteur: Dr. Marichiel Navarro

8:00 - 8:40	Dr. Willem Stevens Thailand	"Valorization of Chitin Containing Marine Wastes: New Small Scale Applications of Chitosan"
8:40 - 9:00	Dr. Teresita M. Espino Philippines	"Prospects of Commercialization of Antibodies Diagnostic Kits for Rapid Detection of Pathogens of Economically Important Crops in the Philippines"
9:00 - 9:30	Dr. Hans F. Illy Germany	"Results of the Evaluation of the CDG-SEAPO Biotech Project"

9:30 - 11:00 Small Group Discussions on Theme A

Coffee Break

11:00 - 12:00 Group Presentations on the Results of the Small Group Discussions

12:00 - 1:00 Lunch Break

Afternoon Session

Moderator: Dr. Maripaz Perez

1:00 - 5:30 Investors' Forum

Mr. Thawatchai Mongkolwai "New Fermented Soy Based Products"
Thailand

Dr. Suwalee Chandkrachang "Bio-Conversion of Shrimp Biowaste into Chitosan"
Thailand

Coffee Break

Mr. Sat't Thaithakul "Production of Effective Anti-cancer Drug from
Thailand *Lentinus edodes* Mushroom"

Dr. Emerlito Borromeo "Commercialization of Mushroom and Mushroom
Philippines Products

THEME B: Policy, Financial, Legal and Bio-safety Issues

Day 4, 27 July 1995

Morning Session

Moderator: Dr. John Barton

Rapporteur: Dr. Catalino Alfafara

8:00 - 8:40 Dr. Quentin Kubicek "Biosafety Regulations and Implications to
U.S.A. Biotechnology Commercialization in Developing
Countries"

8:40 - 9:20 Dr. Hector Lozoya-Saldana "Policies and Management in Plant Biotechnology
Mexico Enterprises in Mexico"

9:20 - 10:00 Dr. Ladislav Kovac "The Balance of State, Public, and Private Enterprises
Slovakia in Biotechnology"

10:00 - 10:30 Coffee Break

10:30 - 11:10 Dr. Matthew O. Ilori "The Activities of Public and Private Sectors in
Nigeria Biotechnology Capability Building in Nigeria"

11:10 - 11:30 Dr. Samuel N.C. Okonkwo "Regional and International Linkages and Cooperation
Nigeria in Biotechnology"

11:30 - 11:50 Dr. Louie Divinagracia "Strategic Marketing and Financial Dimensions of
Philippines Commercializing Agro-biotechnologies by Smaller
Technology-driven Organizations in the Philippines"

11:50 - 1:00 Lunch Break

Afternoon Session

1:00 - 2:30 Small Group Discussions on Theme B

2:30 - 3:30 Group Presentations on the Results of the Small Group Discussions

Coffee Break

THEME C: Assessment of Future Biotechnology Options, Commercialization Prospects and Other Related Issues

Moderator: Dr. Hector Lozoya-Saldana

Rapporteur: Dr. Edwin Calilung

3:30 - 4:10 Dr. John Barton "Technology Management Strategy and Licensing
U.S.A. for Developing National Biotechnology Firms"

4:10 - 4:50 Dr. Micah Krichevsky "Information Technology Application in Biotechnology"
U.S.A.

4:50 - 5:10 Dr. Dorothy Mulenga "Options for Enhancing the Capacity to Commercialize
Zambia Biotechnology in Countries of the Common Market of
Eastern and Southern Africa"

5:10 - 5:30 Dr. Gyan Lal Shrestha "Green Energy as Alternative to Inorganic Chemical
Nepal Energy for Biotechnology Commercialization"

5:30 - 5:50 Dr. Catalino Alfafara "Gluthathione Production in Fed Batch Culture of
Philippines *Saccharomyces cerevisiae*"

Day 5, 28 July 1995

Morning Session

Moderator: Dr. Ida Dalmacio

Rapporteur: Dr. Reynaldo dela Cruz

8:00 - 8:40 Dr. Mozammel Hoq "Potentials for Commercial Development of
Bangladesh Production of Extracellular Enzymes and their
Technology Applications in Developing Countries"

8:40 - 9:00 Dr. Fidel Nayve Jr. "Combined Strategies for Increased Production of
Philippines Monoclonal Antibody against Hepatitis B Surface
Antigen"

9:00 - 10:00 Small Group Discussions on Theme C

10:00 - 10:30 Group Reports on the Results of the Small Group Discussions

10:30 - 11:00 **Integration and Synthesis** Dr. Reynaldo dela Cruz

11:00 - 12:00 **Closing Ceremonies**

Guest Speaker

Dr. William Padolina
Secretary
Department of Science and Technology

12:00 - 1:00 **Farewell Luncheon**

**Statement of Expenses for
the UNIDO-Sponsored Participants
during the International Symposium on Application of Biotechnology
24-28 July 1995, Heritage Hotel, Manila, Philippines**

Names of Sponsored Participants	Country	Cost of Airtickets	Board & Lodging	Travel Expenses
1. Dr. H. Rahman	Bangladesh	US\$ 950.-	Peso 12,224.56 = US\$ 488.98	US\$ 143.-
2. Dr. S.K. Hopper	India	US\$ 1,167.-	Peso 14,521.11 = US\$ 580.84	-
3. Mr. H. Sutarto	Indonesia	US\$ 500.-	Peso 15,377.01 = US\$ 615.08	-
4. Dr. G.L. Shrestha	Nepal	US\$ 850.-	Peso 13,848.95 = US\$ 553.96	US\$ 58.-
5. Mr. Nimit Rodpai	Thailand	US\$ 264.-	Peso 10,064.51 = US\$ 402.58	-
6. Mr. Satit Inaitagoon	Thailand	US\$ 264.-	Peso 9,157.98 = US\$ 366.32	-
7. Mr. Pham Vinh Vien	Vietnam	US\$ 902.-	Peso 12,224.56 = US\$ 488.98	US\$ 35.-
8. Mr. Phan Huy Duc	Vietnam	US\$ 902.-	Peso 12,563.01 = US\$ 502.52	-
Total		US\$ 5,799.00	US\$ 3,999.26	US\$ 236.-
Grand Total (US\$ 5,799.- + US\$ 3,999.26 + US\$ 236.-)			US\$ 10,034.26	
Received first advance from UNIDO			US\$ 8,000.00	
Outstanding Balance			----- US\$ 2,034.26	