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HỢP TÁC VIỆT NAM – ICRISAT NGHIÊN CỨU VÀ PHÁT TRIỂN CÂY LẠC: LỊCH SỬ THÀNH TỰU

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TÓM TẮT

Hợp tác Việt Nam – ICRISAT nghiên cứu và phát triển lạc được thiết lập vào năm 1989 đã đạt được thành quả tăng năng suất cây trồng và đem lại lợi nhuận cho nông dân của Việt Nam. Viện Nghiên cứu Dầu thực vật ở phía Nam (OPI), Viện KHKT Nông Nghiệp Việt Nam (VASI) và Viện bảo vệ thực vật (NIPP) ở phía Bắc đã đóng vai trò chủ yếu làm cho Hợp tác này trở nên hiệu quả và mang lại lợi ích. Những thành tựu có ý nghĩa của Hợp tác là thiết lập năng lực nghiên cứu, làm giàu nguồn gene và giống, nghiên cứu dinh dưỡng, bảo vệ thực vật và công nghệ sản xuất. OPI đã nghiên cứu thành công và đưa ra sản xuất nhiều giống lạc ưu việt (VD₁, VD₂, VD₅, VD₆ và VD₇), đã thương mại hóa phân thay tro dừa (ACA) nay đã được sử dụng rộng rãi như một phân bón chuyên dùng cho lạc. OPI cũng đã trở thành cơ quan dẫn đầu trong sản xuất hạt giống để bảo đảm có đủ hạt giống chất lượng cao của các giống mới cung cấp cho nông dân. Những nghiên cứu tiếp theo trong sản xuất cũng như thương mại sản phẩm lạc ở Việt Nam là phát triển các giống lạc bánh mít kẹo (hạt lớn) với tỷ lệ O/L cao và kháng lây nhiễm Aflatoxin. OPI có nhiều tiềm năng hướng đến giải quyết những vấn đề này.

VIETNAM - ICRISAT PARTNERSHIP IN GROUNDNUT RESEARCH AND DEVELOPMENT: A SUCCESS STORY

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ABSTRACT

The Vietnam-ICRISAT partnership in groundnut research and development, which was formulized in 1989, has been a successful venture resulting in increased productivity of the crop and benefiting the farmers of the country. The OPI in the South and VASI and NIPP in North have played a major role in making this partnership productive and beneficial to the farmers. The significant achievements of the partnership include capacity building, enrichment of genetic and breeding resources, crop nutrition, plant protection and production technology. OPI has developed/released many improved varieties of groundnut (VD₁, VD₂, VD₅, VD₆ and VD₇) and commercialized a substitute of natural coconut ash (ACA, alternative coconut ash) which is extensively used as fertilizer in groundnut. It has also taken a lead in seed production to ensure availability of good

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quality seed of improved varieties to the farmers. The future research needs of groundnut production and trade in Vietnam are development of confectionery varieties with high O/L ratio and containment of aflatoxin contamination. OPI has potential to address to these issues.

1. INTRODUCTION

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), established in 1972 at Patancheru, Andhra Pradesh, India, is a non-profit, non-political, international organization of science-based agricultural development. It is one of the 15 Centers supported by the Consultative Group on International Agricultural Research (CGIAR). ICRISAT's mission is to help the poor of the semi-arid tropics through science with a human face and partnership-based research for development to increase agricultural productivity and food security, reduce poverty, and protect the environment in the semi-arid production systems. ICRISAT's research agenda focuses on four global research themes. Harnessing biotechnology for the poor; Crop improvement, management and utilization for food security and health, Agroecosystems and Markets, policy and impacts. Besides natural resources management, ICRISAT conducts research on sorghum, pearl millet, chickpea, pigeonpea and groundnut- crops that support the livelihoods of the poorest of the poor in the semi-arid tropics encompassing 48 countries in sub-Saharan Africa and Asia. ICRISAT also shares information and knowledge through capacity building, publications and ICTs.

2. ICRISAT- MARD COLLABORATION

ICRISAT's partnership with MARD (earlier known as Ministry of Agriculture and Food Industry, MAFI) dates back to 1989 when an MoU was signed between the two institutions. The research and development in agriculture sector in Vietnam was in its infancy at that time and ICRISAT invited the country to become a partner in a larger network of research and development in Asia. The scientists in the country had remained isolated from their fraternity elsewhere due to long-drawn war for independence. For effective and productive partnership, it was essential to update the skills of partners and help them to interact and develop contacts with international scientific community. The MoU identified the following areas for collaboration.

ICRISAT to provide

1. Consultants to advise and assist the research efforts of MAFI
2. Opportunities for cooperative research and in-service short- and long-term training to Vietnamese scientists
3. Opportunities for doctoral research to Vietnamese scientists
4. Relevant scientific literature, information and publications
5. Farming systems technology and germplasm and breeding materials
6. Opportunities to Vietnamese scientists for participation in international workshops and conferences at ICRISAT and other places

MAFI to provide/facilitate

1. Office, laboratory and field facilities, staff and logistics for cooperative research projects
2. Travel, import of equipments, custom and quarantine clearance for seed shipments
3. Meetings and monitoring tours
4. Germplasm collection and sharing it with ICRISAT Gene Bank

The main focus of ICRISAT-MARD collaboration has been on groundnut improvement and production research. Since 1999, ICRISAT is also collaborating in the area of natural resources management.

3. PRIORITY AREAS FOR COLLABORATIVE RESEARCH

The first ICRISAT mission to appraise groundnut situation in Vietnam was undertaken in 1991. A multidisciplinary team of scientists from ICRISAT together with the scientists from VASI and NIPP in North Vietnam and OPI and IAS in South Vietnam surveyed the major groundnut growing areas in the country and interacted with farmers and local leadership to identify groundnut production constraints and evolve appropriate research strategy to develop solutions compatible to local agro-ecological, socio-economic and political environment.

The current priority research areas include

- Develop short- and medium-duration and confectionary type cultivars with high yield and resistance to diseases – early leaf spot, late leaf spot, rust, bacterial wilt and to insect pests – *Spodoptera*, *Helicoverpa*, white grubs and hairy caterpillar
- Agroclimatic analysis to calculate probabilities of drought and waterlogging incidences, designing appropriate ideotypes and identifying genotypes with enhanced drought and water logging resistance and low temperature tolerance
- Management practices for control of aflatoxin contamination, damping off and collar rot
- Development of IPM techniques
- Develop appropriate *Rhizobium* inoculum production system and method of inoculation
- Diagnosis of nutrient imbalances and development of most economic alleviation measures
- Demonstrate high yielding varieties and improved crop production technology in farmers fields to obtain economically optimum pod yields of groundnut
- Economic analysis to quantify efficiency of groundnut production in various eco-regions of Vietnam under both sole and intercropping systems

4. SIGNIFICANT ACHIEVEMENTS

Capacity building. Since 1989, 5 six-month in-service and 4 short-term in-service trainees and 10 research fellows have undergone training at ICRISAT in various aspects of agricultural research and development with focus on groundnut. During 1995-2004, 33 Vietnamese scientists visited ICRISAT to participate in various events. During the same period, 66 ICRISAT scientists paid visit to Vietnam. These visits resulted in information exchange, skill upgrade, development of joint research proposals, preparation of joint research publications and catalyzing collaborative research activities. ICRISAT sent two scientists (a breeder to OPI and an entomologist to NIPP) on 6-8 month assignments in Vietnam to organize the local research programs and give hands-on training to scientists and technician in their respective fields of specialization. Two scientists from Vietnam completed their doctoral research at ICRISAT.

Enrichment of genetic and breeding resources. The farmers in Vietnam prefer groundnut varieties with short-duration (90-100 days), high yield, high shelling turnover, high oil content and resistance to diseases and insect pests. To facilitate *in-situ* selection and development of new varieties with farmer-preferred traits, ICRISAT supplied 65 sets of international groundnut varietal trials (34 to South Vietnam), 1262 advanced breeding lines (584 to South Vietnam) and 602 segregating populations (271 to South Vietnam) to Vietnam during 1991-2004. In addition, OPI also collected and evaluated varieties of local origin and breeding materials locally developed. From these materials, OPI and other institutions have developed/released the following groundnut varieties for cultivation in the country.

- LRDC, VASI released in 2002 ICGV 86143 as LO 5 in north Vietnam and Hung Loc station released in 2002 ICGV 86015 as HL 25 in South Vietnam.
- VD 1 and VD 5, developed by OPI, are approved by the Government for the Eastern Region of South Vietnam. In large production plots in Cu Chi, Trang Bang, Hoa Thanh, Duong Minh Chau, Vinh Cuu and Giong Trom districts, VD 1 gave 4-42% higher pod yield than the local varieties.
- OPI selected VD 2 from the segregating material supplied by ICRISAT. It is resistant to *Aspergillus flavus* infection. Other promising varieties awaiting release are VD 9 (ICG 8666) and VD 10 (ICG 8645). These two varieties are tolerant/resistant to bacterial wilt disease. ID 2, ID 3, ID 12, ID 13 and ID 14 are the promising drought tolerant varieties.

OPI has taken a lead in groundnut seed multiplication to ensure supply of good quality seed in required quantities to farmers.

Crop nutrition. A substitute (ACA, Alternative Coconut Ash) of natural coconut ash, commonly used as fertilizer in groundnut cultivation in South Vietnam, was developed by OPI and commercialized through a private fertilizer company. ACA is a fertilizer mixture that contains N, P, K, Ca, Mg and micronutrients in the amounts found in

natural coconut ash. It reduces fertilizer cost by 24% and unit production cost by 10%. Similarly, to increase effectiveness of *Rhizobium* inoculation, a starter dose of mineral nitrogen (20-30 kg ha⁻¹) was recommended for cultivation in South Vietnam.

In North Vietnam, lime application in two split doses (in lieu of gypsum as a source of calcium) gave 22 to 29% more yield than the control treatment, either alone or in combination with *Rhizobium* inoculation and fungicide seed treatment. The lime application gave increased income of US \$ 130 ha⁻¹ with a benefit: cost ratio of 1.18.

Plant protection. Need based chemical application following pheromone trap data and catch crop gave effective control of *Spodoptera*. IPM techniques for groundnut was also released and applied in large production through Vietnam – ICRISAT collaborative studies.

Production technology. Use of polythene mulch in winter-sown (24 Jan and 04 Feb) groundnut in North Vietnam gave 30-60% and in South Vietnam 40 – 45% more pod yield than the farmer's practice. It improved germination, seeding vigor and crop growth. A combination of high yielding varieties and polythene mulch gave 50-80% more yield than farmer's practice. The technology is spreading quickly in Bac Giang, Vinh Phuc, Ha Noi, Ha Tay and Ninh Binh provinces in the North, and in Tay Ninh, Binh Duong, Soc Trang, Tra Vinh provinces in the South.

5. IMPACT OF COLLABORATIVE RESEARCH AND DEVELOPMENT. GROUNDNUT IN VIETNAM-THEN AND NOW

In 1980, the groundnut area in Vietnam was 106,100 ha with a total production of 95200 metric ton and an average productivity of 897.3 kg ha⁻¹. In the 1980s, the annual growth rate in area was 7.06 %, in productivity 1.52 % and in production 8.69 %. In 1990, the area was 201,400 ha, the productivity 1059 kg ha⁻¹ and total production 213,200 metric ton. They further increased to 244,900 ha, 1451 kg ha⁻¹ and 355,300 metric ton, respectively, in 2000. The annual growth rates during the 1990s were 2.09 % for area, 3.23 % for productivity and 5.38 % for total production. In the decade of 80s, the growth in production largely came from expansion of area. However, in the 90s, the growth in productivity contributed more than the expansion in area to the total production. The gains in productivity were the direct result of the collaborative on-station and on-farm groundnut research carried out jointly by OPI, VASI, NIPP, IAS and ICRISAT. A large part of the credit for these significant achievements goes to Vietnamese farmers who are hard working and highly receptive of improved technologies.

6. FUTURE NEEDS OF GROUNDNUT IN VIETNAM

Over the years, the oil use of groundnut has shown a declining trend and food use an upward trend. Therefore for Vietnam to remain an important player in international trade of groundnut, it should develop varieties suitable for different food uses. A high quality produce free from aflatoxin contamination and chemical residues is the essential requirement for food use. A high oleic (O) to linoleic (L) fatty acid ratio is responsible

for longer shelf life of groundnut products. For food use, varieties with high O/L ratio are preferred by food processors. Environment friendly, better and effective integrated crop management practices are needed to improve productivity and quality of produce.

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