

## Duty and Function

### Rice Research Section

#### Research Activities

Favorable Rice Ecosystem

- Irrigated lowland rice, Rain-fed lowland rice

Unfavorable Rice Ecosystem

- Submerge tolerance rice, Drought tolerance rice, Salinity tolerance rice, Drought tolerance rice, Upland rice, Heat stress tolerance rice

Across Environment

- BB resistant, Quality Rice

Breeder seed production

Nucleus seed production

#### Released varieties

Irrigated lowland rice	30
Rainfed lowland rice	41
Aerobic rice	7
Drought tolerance rice	8
Upland rice	2
Salinity tolerance rice	7
Deep water rice	8
Submergence tolerance rice	2
Quality rice	10
<b>Total</b>	<b>115</b>

### Hybrid Rice Research Section

Hybrid Rice Research section, Rice Division of DAR is mainly conducting the hybrid rice research based on three line hybrid of Cytoplasmic- genetic Male Sterility System. The three parental lines of (A, B and R) are needed in this breeding program to develop hybrid rice varieties. Heterosis or hybrid vigour will be exploited to obtain higher performance of yield and other agronomic traits compare with inbred varieties. Hybrid rice research program is being conducted with the following objectives.

- To develop F<sub>1</sub> Rice Hybrids with 20% yield advantage over local HYV (High Yielding Varieties)
- To develop own parental lines with good quality and adaptability
- To maintain the purification of parental lines

## Research Activities

### (1) Development of Parental Lines (A, B, R )

Breeding Nurseries, such as Source Nursery, Test Cross Nursery, Backcross Nursery and Retest cross Nursery are grown in both wet and dry seasons to conduct the breeding process. For the R line and B Line improvement, hybridization and selection of populations in different generations have been done.

### (2) Maintenance and Multiplication of CMS lines.

### (3) Seed Production of Experimental Rice Hybrids

The promising lines from Combining Ability Test have been produced for heterosis evaluation in different locations.

### (4) Evaluation of Experimental Hybrids

After Replicated Yield Trials of multi-locations, the promising combination among testing entries is selected to advanced trial and demonstration plots in farmers' field as on farm trial.

### (5) Evaluation and Maintenance of Restorer Lines and Maintainer Lines.

Evaluation and Maintenance of the parental lines has to be concerned for F1 seed production and future utilization.

### (6) Seed Production of Promising hybrids.

## Achievements

Yezin Palethwe 1 and Yezin PaleThwe -2 were released in 2014, and Yezin Palethwe -3 and Theingi Palethwe were released in 2015.

## Breeding Program

For the the breeding program of A Line development for new CMS line , R Line breeding and Selection and B Line improvement is being carried out with the collaboration of Plant Biotechnology Section and Plant Pathology section. Being a public member of HRDC (Hybrid Rice Development Consortium), Department of Agricultural Research (DAR) has contributed in collaboration program of hybrid rice research.

## Maize and Other Cereal Crops Research Section

The section is responsible for the improvement of maize, wheat, sorghum and other small grain cereals. The following objectives have been pursued for each specific mandate crop.

1. Development of high yielding open pollinated maize varieties (OPV) and hybrids resistant to stalk rot and Rhizotonia leaf and sheath blight for the lowland tropics and *Helmenthosporium turcicum* blight for hilly subtropics.
2. Development of rust resistant wheat varieties with good quality and high yields for different agro ecological zones.

### 3. Development of shootfly resistant dual purpose sorghum varieties.

In order to achieve the above objectives, breeding and hybridization programs for each mandate crop are in full sowing at DAR and its satellite farms.

Moreover, other Cereal Crops research program is actively participating in CIMMYT's International Maize and Wheat Testing Programs and also ICRISAT's; International Sorghum and Pearl Millet Testing Programs. It also participates in Tropical Asia Maize Network (TAMNET); which is a regional network organized by FAO to strengthen cooperation and collaboration among Asian NARS in maize research and development activities.

To date, 12 open pollinated (OPV) and 5 hybrid maize varieties, 7 wheat, 11 sorghum and 4 pearl millet varieties have been released as commercial varieties. These improved varieties of maize, wheat and sorghum respectively, now cover 50%, 14% and 13% of the total sown area of concerned crops.

Hybrid corn research program has been initiated at DAR, Yezin, since 1974-75. In 1990-91 two high yielding single cross hybrid varieties namely Yezin Hybrids # 1 and Yezin Hybrids # 2 were released for the first time in Myanmar as commercial hybrids. These hybrids have a yield superiority of 30-35% over the best check OPVs. From 1993 to 2003, three new hybrids Yezin Hybrids # 3, Yezin Hybrids # 4 and Yezin Hybrids # 5 were released out of national maize improvement program and also released three new Yezin Hybrids # 6, Yezin Hybrids # 10 and Yezin Hybrids # 11 in 2010 to 2013. Yezin Hybrid # 2 and # 4 are early varieties with lowland tropic adaptation.

Yezin hybrid # 3 is an intermediate variety with high land subtropics adaptation and is highly resistant to *helminthosporium* leaf blight disease which is very severe in the Shan State. These hybrids now cover more than 20% of total maize area. At present, DAR is also involved in the production of hybrid maize seeds at different farms under DOA and also jointly between DAR and Extension Division on the farmer's fields at various townships. During 2002-2003 growing season, 120,000 acres were under DAR maize hybrids. It is targeted to produce hybrid seeds to cover 50% of the total maize area in 2004-2005 and 70% in 2005-2006.

Fresh corn variety Yezin Fresh Corn-1 has been released in 2013. White Sorghum Yezin-7 released in 1987 and millet Pale-3 and Pale-4 varieties released in 1984. Wheat Zaloke Phyu-1, Wheat Zaloke Phyu-2, Wheat Zaloke Phyu-4, Wheat Zaloke Phyu-8, Wheat Zaloke Phyu-9 and Wheat Zaloke Phyu-10 have been released in 2013-2014.

### **Oilseed Crops Section**

Oilseed crops occupy about 17% of the total cultivated land in Myanmar. Myanmar depends mainly on groundnut, sesame and sunflower for edible oil, and consequently the division is

concentrating its research on the improvement of yield and quality of those crops. Niger and safflower, are also included in the program as minor oilseed crops.

The objectives of the division are to develop improved varieties of groundnut, sesame and sunflower through varietal improvement programs and to generate new agro-techniques for these crops.

With the objectives of improving tolerance to biotic and abiotic stresses, developing short duration and improving better confectionary types, varietal improvement program of groundnut is under progress.

Sunflower research is being carried out along with the objectives of improving seed quality, shortening maturity period and increasing productivity for all maturity groups.

Sunflower research activities are being implemented to maintain and produce good yielding open pollinated varieties as well as to develop hybrid sunflower.

Minor oilseed crop research program is being pursued to develop early maturing varieties with photo-insensitive trait for niger and to develop spinless varieties with good yield for safflower.

The section products foundation seed of the three main oilseed crops for the Seed Division. The section is also carrying out agro-techniques, fertilizer and plant protection experiments on groundnut, sesame and sunflower in cooperation with concerned divisions and with DAR satellite farms.

The section has released seven improved varieties of groundnut, four sesame, two open pollinated and one hybrid sunflower, one niger and one safflower for commercial production.

Improved varieties of groundnut, sesame and sunflower have now covered approximately 20%, 40% and 5% respectively of total cultivated areas concerned.

Groundnut research and development activities are being carried out in collaboration with ICRISAT.

A high yielding hybrid sunflower variety has been successfully developed and released in 2001-2002. It covered over 2000 acres in 2002-2003 and 4625 acres in 2003-2004. It is projected to produce hybrid sunflower seed for 10000 acres in 2004-2005. Parental line seed increase is mainly done at DAR and Tatkon research farm. F<sub>1</sub> seed production is being carried out in Tatkon, Sibin and Chaungmagyi farms.

## **Food Legumes Research Section**

Food Legumes Research conducted to breed high yielding varieties adaptable to different agro climatic zones, to produce new exportable quality varieties, to improve high yielding varieties tolerance to pests and diseases and to thrive breeder seed production of released varieties.

## **Released varieties**

- Greengram - 12
- Blackgram - 5
- Pigeonpea - 6
- Chickpea - 10
- Soybean - 12
- Cowpea - 2

## **Research Activities**

- Green gram - High yielding and Yellow Mosaic Disease Resistance
- Black gram - High yield and Yellow Mosaic Disease Resistance
- Pigeonpea - Medium duration hybrid pigeonpea variety
- Chickpea - High yield variety with resistance to pod borer
- Soybean - Early maturity, high yield and adaptable all seasons & locations
- Cowpea - High yield and exportable quality

## **Future Research Objectives**

- Green gram - To get Dry root rot Tolerance Variety
  - To develop Yezin-1 Variety with resistance to YMV disease
- Black gram - To get Yellow Mosaic Resistance Variety with dull black colour
- Pigeonpea - To release Super Early Pigeon pea Variety
- Chick pea - To get Wilt Disease Tolerance Variety

## **Industrial Crop Research Section**

### **Sugarcane Research**

#### **Research Activities**

- Improvement of New Sugarcane Varieties with High Cane and Sugar Yield.
- Improvement of Disease Resistant Sugarcane Varieties (Smut and Red Rot Diseases)
- Improvement of Drought Resistant Sugarcane Varieties
- Improvement of Stemborer Resistant Sugarcane Varieties
- Investigation of Effective Herbicides for Controlling Weeds in Sugarcane Field
- Investigating Proper Row Spacing and Seed Cane Sett Rate to achieve Better Cane Growth and Yield.

#### **Achievement**

Four Sugar varieties

- 1) Yezin – 1
- 2) Yezin – 2

3) Yezin – 3

4) DAR – 4

Yezin -1 and Yezin -2 are widely grown

DAR – 4 is newly released varieties which are being multiplied and distributed to farmers from Sagaing, Mandalay and Bago Regions and Shan State.

### **Research Activities**

#### **Cotton**

- Development of drought resistant cotton variety
- Development of sucking pest resistant cotton variety
- Development of varieties with high yielding and better fiber quality
- Improved cultural practices to ascertain high yield

#### **Jute and Kenaf**

- germplasm maintenance and Seed multiplication
- Finding out improved agronomic techniques for getting high yield

#### **Cassava**

- Germplasm maintenance
- Regional Adaptive varietal Trials
- Establishment of Agronomic techniques for getting high yield

### **Achievements**

#### **Cotton**

- 1) Yezin Long-staple cotton - 1
- 2) Yezin Long-staple cotton - 2
- 3) Yezin Long-staple cotton - 3
- 4) Yezin Long-staple cotton – 4
- 5) Yezin Short-staple cotton – 1
- 6) Yezin Short-staple cotton – 2
- 7) Yezin Short-staple cotton – 3

#### **Jute**

- 1) Yezin white Jute – 1
- 2) Yezin white Jute – 2
- 3) Yezin white Jute – 3
- 4) Yezin white Jute – 4
- 5) Yezin white Jute – 5
- 6) Yezin white Jute – 6
- 7) Yezin white Jute – 7

Yezin white jute – 3 and white jute – 7 are widely grown.

- 1) Yezintossa jute – 1

- 2) Yezintossa jute – 2
- 3) Yezintossa jute – 3
- 4) Yezintossa jute – 4
- 5) Yezintossa jute – 5
- 6) Yezintossa jute – 6

Yezintossa jute – 1 is widely grown in Myanmar.

### **Kenaf**

Yezinkenaf – 1

It is widely grown in Ayeyarwady Region.

## **Horticulture Research Section**

### **Research Activities**

Tomato –High yield, acceptable quality of fruit, and yellow leaf curl virus resistance

Chilli –High yield, acceptable quality of fruit

Eggplant – High yield and better quality

Okra – High yield and yellow mosaic virus resistance

Vegetable Soybean – High yield and high protein content

Sweet Potato - High yield and better quality

Pumpkin – High yield and tropically adapted open pollinated variety

Bitter gourd -High yield and tropically adapted open pollinated variety

### **Achievements**

Varietal Improvement

- |             |              |                 |
|-------------|--------------|-----------------|
| 1. Tomato   | 2(released)  | 2(widely grown) |
| 2. Okra     | 1 (released) | 1(widely grown) |
| 3. Eggplant | 1 (released) | 1(widely grown) |

### **Horticultural Techniques**

- Leafy vegetable production with hydroponic
- Quality Tomato and pepper with Fertigation
- Off-season production in Mango
- Off-season production in Dragon Fruit

## **Soil Science Research Section**

Soil science research section was conducting to develop technology package that will enhance soil fertility maintenance in crop production, improve nutrient use efficiency of fertilizer for the agricultural crops, develop adaptive research for the climate change through the screening of low

fertility tolerant crop varieties, formulate effective and low-cost fertilizer for the farmers and develop national soil and plant laboratory.

### **Research Achievement**

- Efficient utilization of urea fertilizer blended with same volume of FYM powder increases 15-20% rice grain yield and save up to 30% of urea used.
- As much as 4% rice grain yield increased through the equal split application of potash fertilizer at basal and maximum tillering stage was realized.
- Farmers adopted the application of Gypsum as a source of sulfur because they realized that as much as 18% of rice yield could be increased through the basal dressing of 8 kg S ha<sup>-1</sup>.
- Up to 10% rice yielding could be achieved through the basal application of zinc sulfate at the rate of 1 kg Zn ha<sup>-1</sup>.
- Late fertilization of N and B on rice and food legume would be suggested as low cost technology due to the salient research findings that explained 30% rice grain yield and 34% legume yield could be increased through late foliar application of N and B.
- Seed dressing of Mo to the legumes could enhance legume yield up to 30% to 40%.
- Research oriented Bio-Super Foliar Fertilizer production was introduced to the farmers and it could increase rice yield up to 21% as well as legume yield up to 35%.
- Seed dressing of Mo to the legumes could enhance legume yield up to 30% to 40%.
- Nitrogen responsive curve for different high yielding rice varieties under specific location has been developed and the amount of N to be applied to get maximum profitable yield ranges from 57 kg N ha<sup>-1</sup> to 81 kg N ha<sup>-1</sup>.
- □ As an average nitrogen uptake of the hybrid rice varieties can be varied from 105 kg N ha<sup>-1</sup> season<sup>-1</sup> to 161 kg N ha<sup>-1</sup> season<sup>-1</sup>, the amount of urea at the rate of 228 kg urea ha<sup>-1</sup> to 350 kg urea ha<sup>-1</sup> could be advisable as a blanket recommendation.
- Among 106 rice lines tested, Yeahnelo-1 (Yezinyar-9), IRAT-191, Inmayebaw, Shwemanaw (Tamilnadu), Malaytun (MR-230), and MR-9 could be identified as low-N tolerance rated by GYEI with index>1, and responsive-efficient (R-E) by both mean grain yield and Internal Efficiency Index of N.

### **Water Utilization Research Section**

#### **Research Activities**

- Development of effective water saving technology under irrigated rice
- Development of appropriate water harvesting technology for central dry zone
- Study of crop and water relationship
- Screening of drought tolerance crop genotypes with high water use efficiency for plant breeder



- Testing irrigation water quality and grain quality
- Production and distribution of soil test kit

### **Achievements**

- Alternate wetting and drying (AWD) is an appropriate water saving practice in terms of irrigation frequency, water productivity and water saving by 35 – 50 % depend on soil type
- The critical growth stage to drought stress:
  - Green gram – pod formation stage
  - Groundnut – pegging stage
  - Sesame – flowering stage
- Corn yield of zero tillage and crop residue mulching practice at postmonsoon season showed 30% higher than conventional tillage.
- Gliricidia wind break plantation improve soil moisture and give plant nutrient from the plant's residue. Therefore, this practices increase 10 – 12 % of yield.

### **Agronomy Research Section**

Agronomic research activities aim to develop improved crop production technologies, with the efficient utilization and conservation of natural resources and to develop more efficient sustainable agricultural systems in favorable and unfavorable ecosystems.

#### **Research Activities**

##### **-Cropping Systems**

Identify rice-based cropping systems and upland crop-based cropping systems.

##### **-Rice Agro-technique**

Generate crop management technologies of planting methods (Rice Transplanter, System of Rice Intensification (SRI) and Modern System of Rice Intensification (MSRI)), optimum time of sowing, optimum plant population and seed rate, right seeding age etc., for rice varieties to be released and released in wet and dry seasons.

##### **-Rice Weed Management**

Weed management options such as variety-weed competition, nitrogen-weed competition, time of weeding, methods of weed control and evaluation of herbicides etc.

##### **-Seed Production**

Production of foundation seed for seed farms of Myanmar Agriculture Service and satellite research farms of Department of Agricultural Research (DAR).

#### **Achievements**

##### **-Cropping Systems (Rice-based)**

Rice-Food Legumes-Rice cropping pattern that improve soil fertility.

##### **-Rice Agro-technique**

- Dry directed seeded rice

- Direct wet and dry seeding
- Optimum plant population
- Optimum seed rate
- The best time of sowing for summer and monsoon rice
- Delay sowing time of local rice varieties that was grown as a second rice crop
- Optimum time of harvest
- Rice Weed Management
  - Selection of herbicides available at market
  - Nitrogen-weed competition on wet seeded rice
  - Time of weeding
  - Weed management on dry directed seeded rice

### **Agricultural Economics Research Section**

Agricultural Economics Research Section conduct research activities on Agricultural System Development and collaboration with other section, research farms and organizations.

### **Agricultural Statistics Research Section**

Agricultural Statistics Research section conduct the collection of agricultural statistics necessary for the formulation of various agricultural research plans, reporting and compilation of agricultural statistics and publication of some highlight factors.

### **Seed Bank Research Section Activities**

1. Exploration, collection and introduction
2. Characterization, multiplication and regeneration
3. Pre-breeding/ Evaluation
4. Conservation
5. Data management

#### **Conservation and Distribution (Up to March 2017)**

Sr.	Crop group	Conservation	Distribution		
			Domestic	Abroad	Total
1	Rice	7757	7870	9326	17196
2	Wild rice	180	104	600	704
3	Legume	1578	1681	878	2559
4	Cereal	2233	380	479	859
5	Oilseed	797	80	111	191
6	Vegetables & others	125	36	735	771
	<b>Total</b>	<b>12670</b>	<b>10151</b>	<b>12129</b>	<b>22280</b>

## Plant Pathology Research

The Division of Plant Pathology established in 1954 as Mycology Section of Agricultural Research Institute (ARI) at Gyogone, Insein Township in Yangon Division to initiate mycological and plant pathological research in Myanmar. The divisional status was changed to the Section of Plant Pathology in 2004 after the Institute was separately organized into Department of Agricultural Research (DAR).

With view of developing disease management practices and improving bio-fertilizer production, the Plant Pathology Section (PPS) has laid down the following three objectives.

- To evaluate disease resistant varieties
- To find out appropriate control measures for plant diseases
- To study the ability of effective micro-organism and bio-fertilizer production

### Achievement of Resistant Screening

<u>Crop</u>	<u>Disease</u>	<u>Resistant Varieties</u>
Rice	- Bacterial Leaf Blight (BLB)	- Sinthukha , Shwe Myanmar
	-Bacterial Leaf Streak (BLS)	- Manawthukha
	- Blast	- Yadanar Toe, Yar -1, Yar -8
	- Sheath Blight (ShBlight)	- Manawthukha, Shwe Myanmar
Sesame	- Black Stem	- Sinyadanar - 6
Greengram	- Cercospora Leaf Spot	- Yezin- 4,7, 12
	- Yellow Mosaic Virus	- Yezin- 10,11,12,14
Sugarcane	- Red Rot	- DAR-4, Kyaukseim, VMC -74/527

### Achievement of Disease management

<u>Crop</u>	<u>Diseases and Effective controls</u>
Rice	- BLB (Potash 56 lb/ac + Mencozeb) - BLB (Potash 13 kg/ac + 3 kg/ac spray + 3 kg/ac spray) Basal + EPI + Booting Stage of Rice - BLS (Potash 56 lb/ac + Fungiking) - Blast (Fuji One)
Maize	- Banded Leaf & Sheath Blight (Deleafing + Trichoderma + Benomyl)
Sesame	- Black Stem (Trichoderma + Carbendazim)
Groundnut	- Collor rot (Carbendazim)
Greengram	- Dry Root Rot (Trichoderma + Carbendazim)

## Biotechnology Research Section

### Research Activities

#### Tissue Culture Based Technology

- Identification of the anther culture response of highly Indicarice genotypes
- Advanced micropropagation with the use of somatic embryogenesis in mango and oil palm
- Identification of in vitro multiplication protocol on coffee
- Mass propagation of banana, medicinal orchid and sugarcane
- In vitro germplasm conservation of banana, potato and tuber crops
- Improvement of high quality and marketable banana variety by using tissue culture and mutation technique

#### Molecular Biology Based Technology

- Genetic diversification of sugarcane, maize and groundnut
- Development of bacterial leaf blight resistance and submergence tolerance in Rice by using marker assisted breeding
- Investigation of promising maize variety carrying Opaque-2 gene
- Identification of molecular markers linked to Yellow Mosaic Virus (YMV) resistant gene in Black Gram
- Identification of rice germplasm carrying salt tolerant gene by using molecular markers
- Development of Tomato Yellow Leaf Curl Virus (TYLCV) resistance in tomato by using marker assisted selection

## Entomology Research Section

Entomology Research Section conducted screening of Brown Plant Hopper and rice stem borer resistant varieties, to find Botanical Insecticides on pests of vegetables, to find Effective Pest Control Method, control of Mango Fruit Fly, control of storage pest in pulses, maize and paddy, analysis of Pesticides residue in fruits and vegetables and forecasting in pest occurrence.

### Achievements

- BPH resistance varieties were observed from 5 Myanmar traditional rice varieties.
- Two highly resistant, 38 resistant and two susceptible varieties to rice stem borer have been observed.
- Tobacco leaves extract and neem leaves extract are effective as Phenthoate on white-backed plant hopper and brown plant hopper.
- Swallow-wart leaves extract is effective as Phenthoate on cut worm caterpillar, *Spodoptera* sp.

- Botanical insecticides have antifeedant action.
- Emulsified groundnut oil, sesame oil and palm oil are effective to control mealy bug and aphid attack on jatropha. Sesame oil is found to be the most effective.
- Garlic and soap solution is effective on cut worm caterpillar, *Spodoptera* sp.
- Using Yellowing sticky board is effective in prevention to stem fly in black gram.

## **New Plant Variety Protection (PVP) Section**

New Plant Variety Protection Law was entered into force on 20<sup>th</sup> January 2017. New Plant Variety Protection (PVP) unit was started under Department of Agricultural Research (DAR) on 10<sup>th</sup> May 2016 and it was raised into New Plant Variety Protection (PVP) Section on 22<sup>nd</sup> March 2017 under DAR. “Intensive Awareness Raising PVP System” Seminar/ Workshop covered by Department of Agricultural Research (DAR), Myanmar, The International Union for the Protection of New Varieties of Plants (UPOV), United States Patent and Trademark Office (USPTO) and Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan at DAR on 5<sup>th</sup> December 2016. 150 participants from different departments attended in this Seminar/Workshop. Plant Variety Protection Training covered by Department of Agricultural Research (DAR), Myanmar and Naktuinbouw, Variety Testing Department and Wageningen University, the Netherlands at DAR from 16<sup>th</sup> January 2017 to 28<sup>th</sup> January 2017. 33 intermediate level participants from different departments attended in this training. Experiments for development of National Test Guidelines on Rice and Maize.

East Asia Plant Variety Protection (EAPVP) Forum Meeting (2017 September), Plant Variety Protection Trainings (within department), Development of National Test Guidelines for 15 major crops and Awareness Raising on the UPOV System of Plant Variety Protection and PVP Law Seminars/Workshops in 2017-18.

## **International Collaborations and On-going Projects**

- (1) International Rice Research Institute (IRRI)
- (2) International Maize and Wheat Improvement Center (CIMMYT)
- (3) International Crops Research Institute for Semi-arid Tropics (ICRISAT)
- (4) International Plant Genetic Resources Institute (IPGRI)  
(Bioversity International)
- (5) Korea Oversea International Cooperation Agency (KOICA)
- (6) National Agro-biodiversity Center, RDA, Korea
- (7) Kobe University, Tokyo Agricultural University and Tsukuba University
- (8) Yunnan Academy of Agricultural Science (YAAS)
- (9) Australian Center for International Agricultural Research (ACIAR)
  - a. Diversification and Intensification of Rice-based Systems in Lower Myanmar

- b. Increasing Productivity of Legume-based Farming Systems in the Central Dry Zone of Myanmar
  - c. Strengthening Institutional Capacity, Extension Services and Rural Livelihoods in the Central Dry Zone and Ayeyarwaddy Delta Regions of Myanmar
  - d. Land Resource Evaluation for Productive and Resilient Landscapes in the Central Dry Zones of Myanmar
- (10) Japan International Cooperation Agency (JICA)  
Development of Water Saving Agriculture Technology in Central Dry Zone
- (11) Rural Development Administration-Korea Project on International Agriculture (RDA-KOPIA)  
- Development of high-yielding quality rice varieties and post harvest technologies, and improvement of crops production technologies
- (12) Food and Agriculture Organization (FAO)  
Reduction of post harvest losses along the rice supply chain in Myanmar
- (13) International Atomic Energy Agency (IAEA)  
Evaluating use efficiency using low Nitrogen Tolerant Rice Varieties
- (14) World Bank  
Agricultural Development Support Project
- (15) M. S. Swaminathan Research Foundation (MSSRF) - Indian Government  
The Establishment of a Rice Bio-Park
- (16) AFACI (Asian Food and Agriculture Cooperation Initiative)
- a. GAP for horticultural crops:  
Development of Locally Appropriate GAP Program for Selected Vegetables in Myanmar
  - b. Post harvest technology for horticultural crops:  
Application of Improved Postharvest Handling of Horticultural Crop in Postharvest Industry in Myanmar
  - c. Seed extension:  
Increasing Quality Seed Sufficiency and Rice Productivity through Application of Production Technology in Myanmar
  - d. Establishment of agricultural technology information network in asia- ATIN:  
Establishment of Agricultural Technology Information Network in Asia (ATIN) Myanmar
  - e. Construction of the Asian Network for Sustainable Organic Farming Technology- ANFSOFT:  
Establishment of Network and Model Manual for Sustainable Organic Farming Technology of Selected Crops in Myanmar

- f. Integrated Management System of Plant Genetic Resources-IMPGR:  
Exploration and Collection of Traditional Landraces of Multi-crops and  
Documentation on Farmer's Indigenous Knowledge for Underutilized Crops in Kayin  
State, Myanmar
- g. Integrated Pest Management-IPM:  
Study on Distribution, Monitoring and Management of Rice Plant Hopper in Endemic  
Areas of Myanmar
- h. Seed Potato:  
Technology Dissemination of Virus-Free Seed Potato Production Using  
Hydroponic Production Systems in Myanmar