The Republic of the Union of Myanmar

DATA COLLECTION SURVEY ON AGRICULTURE SECTOR IN THE REPUBLIC OF THE UNION OF MYANMAR

FINAL REPORT

DECEMBER 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SANYU CONSULTANTS INC.

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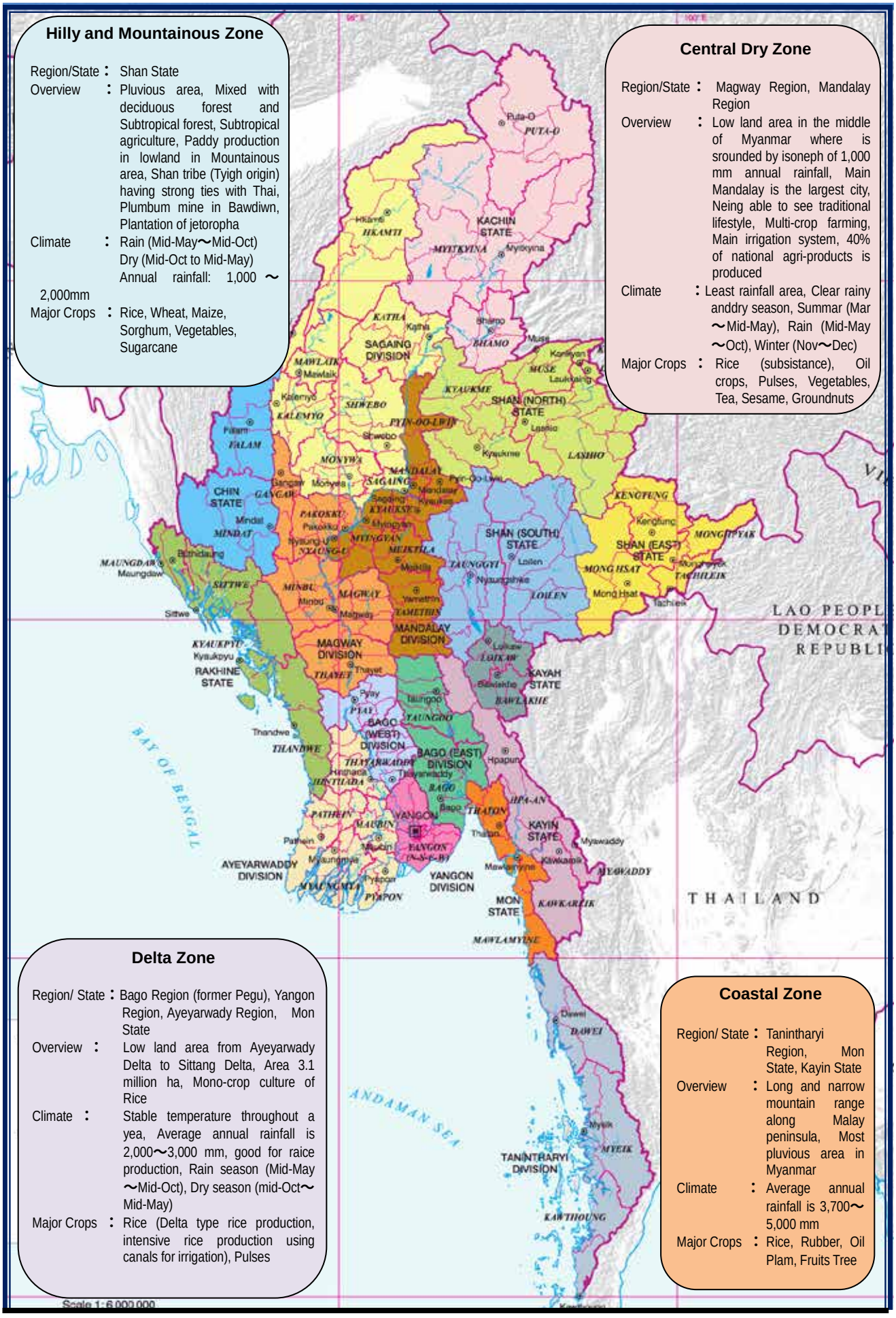
Location Map of the Survey Area
～Agro-ecological Zone～



Hilly and Mountainous Zone

Region/State : Shan State

Overview : Pluvious area, Mixed with deciduous forest and Subtropical forest, Subtropical agriculture, Paddy production in lowland in Mountainous area, Shan tribe (Tyigh origin) having strong ties with Thai, Plumbum mine in Bawdiwn, Plantation of jetoropha

Climate : Rain (Mid-May～Mid-Oct)
Dry (Mid-Oct to Mid-May)
Annual rainfall: 1,000 ～ 2,000mm

Major Crops : Rice, Wheat, Maize, Sorghum, Vegetables, Sugarcane

Central Dry Zone

Region/State : Magway Region, Mandalay Region

Overview : Low land area in the middle of Myanmar where is srounded by isoneph of 1,000 mm annual rainfall, Main Mandalay is the largest city, Neing able to see traditional lifestyle, Multi-crop farming, Main irrigation system, 40% of national agri-products is produced

Climate : Least rainfall area, Clear rainy anddry season, Summar (Mar ～Mid-May), Rain (Mid-May ～Oct), Winter (Nov～Dec)

Major Crops : Rice (subsistance), Oil crops, Pulses, Vegetables, Tea, Sesame, Groundnuts

Delta Zone

Region/ State : Bago Region (former Pegu), Yangon Region, Ayeyarwady Region, Mon State

Overview : Low land area from Ayeyarwady Delta to Sittang Delta, Area 3.1 million ha, Mono-crop culture of Rice

Climate : Stable temperature throughout a yea, Average annual rainfall is 2,000～3,000 mm, good for raice production, Rain season (Mid-May ～Mid-Oct), Dry season (mid-Oct～ Mid-May)

Major Crops : Rice (Delta type rice production, intensive rice production using canals for irrigation), Pulses

Coastal Zone

Region/ State : Tanintharyi Region, Mon State, Kayin State

Overview : Long and narrow mountain range along Malay peninsula, Most pluvious area in Myanmar

Climate : Average annual rainfall is 3,700～ 5,000 mm

Major Crops : Rice, Rubber, Oil Plam, Fruits Tree

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ABBREVIATION

ACARE	Advanced Center of Agricultural Research and Education
ACF	Action Contre la Faim
ACIAR	Australian Center for International Agricultural Research
ACTED	Agency for Technical Cooperation and Development
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AED	Agricultural Extension Division, DOA
AFD	Agence Française de Développement
AMD	Agriculture Mechanization Department, MOAI
ASEAN	Association of South East Asian Nations
ASEAN-CCI	ASEAN Chamber of Commerce and Industry
AVSI	International Volunteers Service Association
BAJ	Bridge Asia Japan
BCC	Burmese Chamber of Commerce
CARI	Central Agriculture Research Institute
CARTC	Central Agriculture Research and Training Centre, DOA
CBM	Central Bank of Myanmar
CD	Cooperative Department, MOC
CDN	Consortium of Dutch NGOs
CDRT	Community Development for Remote Townships Project, UNDP
CDZ	Central Dry Zone
CEC	Crop Exchange Center
CP	Myanmar C.P. Livestock Co., Ltd.
CPO	Crude Palm Oil
CRDI	Credit for Rural Development Institution
CSC	Crop Specialization Companies
CSO	Central Statistical Organization
DAP	Department of Agricultural Planning, MOAI
DAR	Department of Agricultural Research, MOAI
DFID	Department for International Development, UK
DICD	Department of Industrial Crop Development, MOAI
DLF	Directorate of Livestock and Fisheries, MOLFRD
DOA	Department of Agriculture, MOAI
DOF	Department of Fisheries, MOLFRD
DRD	Department of Rural Development, MOLFRD
DTP	Department of Trade Promotion, Ministry of Commerce
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agriculture Organization
FFB	Fresh Fruits Bunch

GAD	General Administration Department
GAHP	Good Animal Husbandry Practice
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GIZ	German Society for International Cooperation
GMO	Genetically Modified Organisms
GMP	Good Manufacturing Practice
GMS-BF	Greater Mekong Sub-Region Business Forum
GOJ	Government of Japan
GOM	Government of Myanmar
GRET	Groupe de Recherche et d' Exchanges Technologique
HACCP	Hazard Analysis Critical Control Point
HDI	Human Development Initiative
ICDP	Integrated Community Development Project
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
ID	Irrigation Department, MOAI
IFAD	International Fund for Agricultural Development
IFT	Institute of Fishing Technology, MOLFRD
IMO	Indigenous Micro Organism (In Myanmar, it is called dochakukin as in Japanese)
IRRI	International Rice Research Institute
JEQC	Joint Economic Quadrangle Committee
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
KRC	Korea Rural Community Cooperation
LBVD	Livestock Breeding and Veterinary Department, MOLFRD
LFDB	Livestock and Fisheries Development Bank (Global Treasure Bank Public Co,. Ltd.)
LIFT	Livelihoods and Food Security Trust Fund
LUD	Land Use Division, DOA, MOAI
MADB	Myanmar Agricultural Development Bank
MAPCO	Myanmar Agribusiness Public Corporation Ltd
MAPT	Myanmar Agricultural Produce Trading (current DTP)
MAS	Myanmar Agriculture Service (current DOA)
MDRI	Myanmar Development Resources Institute
MEB	Myanmar Economic Bank
MEC	Myanmar Economic Corporation
MFA	Myanmar Farmers Association
MFF	Myanmar Fisheries Federation
MFI	Micro Finance Institution
MFPEA	Myanmar Food Processors and Exporters Association
MFPPEA	Myanmar Fishery Products Processors and Exporters Association
MFSPEA	Myanmar Fertilizer, Seed and Pesticide Entrepreneurs Association
MFTB	Myanmar Foreign Trade Bank

MFVPEA	Myanmar Fruits and Vegetable Producers and Exporters Association
MIC	Myanmar Investment Committee
MICB	Myanmar Investment and Commercial Bank
MIS	Market Information System, DAP
MLF	Myanmar Livestock Federation
MMCWA	Myanmar Maternal and Child Welfare Association
MNCWA	Myanmar National Committee for Women's Affairs
MNPED	Ministry of National Planning and Economic Development
MNWCWA	Myanmar National Working Committee for Women's Affairs
MOAI	Ministry of Agriculture and Irrigation
MOBA	Ministry of Border Affairs
MOC	Ministry of Cooperative
MOECF	Ministry of Environmental Conservation and Forestry
MOF	Ministry of Finance
MOH	Ministry of Health
MOLFRD	Ministry of Livestock, Fisheries and Rural Development
MPBSSMA	Myanmar Pulses, Beans and Sesame Seeds Merchants Association
MPPA	Myanmar Paddy Producers Association
MRF	Myanmar Rice Federation
MRIA	Myanmar Rice Industry Association
MRMA	Myanmar Rice Millers Association
MRPPA	Myanmar Rubber Planters and Producers Association
MRPTA	Myanmar Rice and Paddy Traders Association
MSC	Myanmar Supervisory Committee
MSE	Myanmar Supervisory Enterprise
MSE	Myanmar Sugarcane Enterprise
MSLE	Myanmar Small Loan Enterprise
MWAF	Myanmar Women's Affairs Federation
MWEA	Myanmar Women Entrepreneur Association
NAPA	National Adaptation Program of Actions
NGO	Non-Governmental Organization
NPK	Nitrogen, Phosphate, Potassium
ODA	Official Development Assistance
OISCA	Organization for Industrial, Spiritual and Cultural Advancements
PACT	PACT Myanmar
PKO	Palm Kernel Oil
PPD	Plant Protection Division, DOA
PPP	Public Private Partnership
REDD	Reduced Omission from Deforestation and Forest Degradation
RSC	Rice Specialization Companies
RSS	Ribbed Smoke Sheet
SD	Seed Division, DOA
SGS	SGS Myanmar Limited

SGX	Singapore Exchange Ltd.
SICOMS	Singapore Commodity Exchange
SLRD	Settlement and Land Records Department
SME	Small and Medium-sized Enterprise
SMIL	Small and Medium Industry Law
SU-ENCO	Sutech Engineering Co., Ltd.
TCD	Tons Crusing in a Day
TDH	Terre des Hommes Italia
TICA	Thailand International Development Cooperation Agency
TOCOM	Tokyo Commodity Exchange for Industry
TPA	Terra People Association
TS	Township (the smallest administrative unit where government institutions are placed)
TSR	Technically Specified Rubber
UMEHL	Union of Myanmar Economic Holdings Ltd.
UMFCCI	Republic of the Union of Myanmar Federation of Chambers of Commerce and Industry
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNOPS	United Nations Office for Project Services
USAID	U.S. Agency for International Development
UVS	University of Veterinary Science
VFVLML	Vacant, Fallow and Virgin Land Management Law
VFRDC	Vegetable and Fruits Research and Development Center, DOA
VT	Village Tract
VTAC	Village Tract Administration Council
WB	The World Bank
WDC	Water Distribution Committee
WFP	World Food Programme
WRTC	Water, Research and Training Center
WRUD	Water Resources Utilization Department, MOAI
WSPA	World Society for the Protection of Animals
WUA	Water User's Association
WVM	World Vision Myanmar
YAU	Yezin Agriculture University

AGRICULTURE LAND

Le	Paddy field or low land where rice production is possible
Yar	Dry field
Kaing	Farm land in flood plain along river, which emerge by lowering water level of Ayeyarwady River
Kyun	Farm land in holm, which emerge by lowering water level of Ayeyarwady River

WEIGHT CONVERSION

1 basket	Paddy	20.9 kg
1 basket	Wheat	32.7 kg
1 basket	Maize (seed)	24.9 kg
1 basket	Sorghum	28.1 kg
1 basket	Sesame	24.5 kg
1 basket	Mustard	26.1 kg
1 basket	Sunflower	14.5 kg
1 basket	Groundnut	11.4 kg
1 basket	Butter Bean	31.3 kg
1 basket	Sultani	31.3 kg
1 basket	Sultapya	31.3 kg
1 basket	Chick Pea	31.3 kg
1 basket	Duffin Bean	31.3 kg
1 basket	Lablab Bean	31.3 kg
1 basket	Lima bean	31.3 kg
1 basket	Pigeon Pea	32.7 kg
1 basket	Black Gram	32.7 kg
1 basket	Green Gram	32.7 kg
1 basket	Bocate	32.7 kg
1 basket	Soybean	32.7 kg
1 basket	Cowpea	32.7 kg
1 basket	Rice Bean	32.7 kg
1 basket	Garden Pea	32.7 kg
1 basket	Lentil	32.7 kg
1 basket	Krishna Mung	32.7 kg
1 basket	Other Pulses	31.7 kg

FRUITS AND VEGETABLES

Fruits are expressed by Viss and Number, while vegetables are measured by viss in Myanmar Agricultural Statistics. 1 Viss=1.633kg

CONVERSION

1 pyi	8 nohzibu
1 basket	16 pyi
1 viss	1.64 kg

1 lb (pound)	0.453 592 kg
1 inch (in.)	2.54 cm
1 feet (ft.)	30.5 cm
1 acre (ac)	0.405 ha
1 hectare (ha)	2.47 ac

EXCHANGE RATE (NOVEMBER 2013)

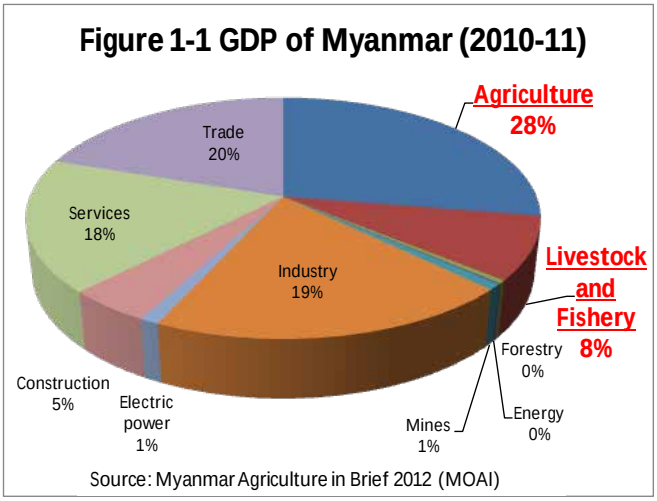
1 US$	=	963.23 Myanmar Kyats
1 US$	=	98.25 Yen
1 Kyat	=	0.102 Yen
1 Lakh	=	100,000 Kyats

FISCAL YEAR

1st of April to 31st of March

CHAPTER 1 INTRODUCTION

1.1 Background of the Survey



The Republic of the Union of Myanmar (hereinafter referred to as "Myanmar"), after experiencing a period of military administration since a democratic movement in 1988, enacted new constitution through a national vote held in May 2008 for self-democratization and held a general election in November 2010, thus a new administrative regime started headed by the President U Thein Sein. Under strong leadership by the President, the regime has initiated and promoted renovation/ revolution of various sectors in order to further push democratization forward. Such state efforts have facilitated increase in foreign support and investment as recently seen, thereby remarkable change has brought about in state economic development.

The new administrative regime has launched a host of new policies and principles in accelerating democratization/ pushing economic renovation forward, among which agriculture is positioned as an important sector as it was before, because it has been a core of industry earning 36% of national GDP in 2010-11 and about 70% of state population has inhabited in rural areas sustaining their livelihood mainly on agricultural activities.

In the light of such a situation, Japanese Government has reviewed the hitherto principles/ guidelines of economic cooperation toward Myanmar, thereby launched new economic cooperation platform consisting of three-tier pillars, namely, "support for improving livelihood of population (inclusive of assistance to ethnic minorities and poverty prone strata, agricultural development, area development), "support for capacity development as well as institutional consolidation of human resources sustaining economy and society (inclusive of that for promoting democratization), and "support for infrastructure and institutional improvement required for sustainable economic growth", as consulted in premier conference held in April 2012.

As a result, such an outstanding change has been brought in surrounding political/ diplomatic environment as a positive movement toward resumption of Japanese ODA toward Myanmar. Taking such torrential change in political/ social situations into consideration, necessity of review has arisen from this situational change on the future status and direction of cooperation in agricultural sector by JICA. In this context, it has become essential to elucidate and analyze newly and successively created policies and legal institutions related to agriculture, current state of ever-changing production and marketing of agricultural products.

1.2 Objective of the Survey

This Study is to be implemented with the objective of collecting and identifying information required

for elaborating examinations on the desirable character of JICA's cooperation in agricultural sector and the future directions, adopting the following three points as the major study targets.

In carrying out the Study, with a view to grasping holistic features of agricultural sector in the country, data and information concerning domestic production, state trade, marketing/ processing and consumption of agricultural products, experiment and research on agriculture, agricultural institutions, contents of activities by assistant organizations are collected, identified and analyzed, and they will be served for elaborating / proposing desirable status/ direction of future cooperation therewith.

(1) To identify current status of agricultural sector in Myanmar,
(2) To analyze and elucidate issues that Myanmar will have to overcome though the implementation of state policies and coping programs and
(3) To propose desirable directions of hereafter cooperation by JICA.

1.3 Target Area

This Study is carried out based mainly on a survey referring to the existing literatures, the information collection from the Government organizations, private enterprises/ groups and aid organizations. For this purpose, information has basically been connected in Nay Pyi Taw and Yangon. In local/ rural areas, field study on agricultural production (such as irrigation facilities, farm households/ plots) has not basically performed. On current basis, information collection has so far been made from the organizations listed in the table shown below:

Table1-1 (1) Target organizations for information collection in this Survey

Target Ministries, Agencies and their Divisions	
Name of Ministries (Nay Pyi Taw)	Selected division/ departments as the targets of this Study
1. Ministry of Agriculture & Irrigation (MOAI)	Department of Agricultural Planning (DAP), Department of Agriculture (DOA), Department of Irrigation (ID), Agricultural Mechanization Department (AMD), Settlement and Land Records Department (SLRD), Water Resources Utilization Department (WRUD), Myanmar Agricultural Development Bank (MADB), Department of Agricultural Research (DAR), Yezin Agricultural University (YAU), Department of Industrial Crop Development (DICD)
2. Ministry of Livestock, Fisheries and Rural Development (MOLFRD)	Directorate of Livestock and Fisheries (DLF), Department of Fisheries (DOF), Livestock Breeding and Veterinary Department (LBVD), Department of Rural Development (DRD)
3. Ministry of Cooperative	Department of Cooperatives, Department of Medium-and-Small Enterprises, Agency of Exports-Imports Cooperatives, Cooperative Bank
4. Ministry of Commerce	Directorate of Trade Affairs, Department of Trade Promotion (DTP)
5. Ministry of National Planning and Economic Development	Department of Planning, Central Statistical Organization
6. Ministry of Border Affaires	Department of Border Areas/ National Races
7. Ministry of Environmental Conservation and Forestry	Department of Forest
8. Ministry of Health	Department of Food and Drug Administration

Note：Ministry of Livestock and Fisheries are amalgamated with Department of Rural Development into Ministry of Livestock, Fisheries and Rural Development in September 2013.

Table1-1 (2) Target organizations for information collection in this Survey

International Aid organizations/ private enterprises etc as target organizations in this Study (Yangon)
1. Permanent Representative Office of JICA
2. Office of JETRO
3. Republic of the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) & related associations (MPBSSMA, MFVPEA etc)
4. Myanmar Rice Federation (MRF) & related associations (MFA, RSC, etc.)
5. Myanmar Livestock Federation (MLF) & related associations (MFPPEA, etc.)
6. Development partners (UNDP, UNOPS (LIFT), FAO, USAID, GIZ, KOICA, EU, ACIAR, etc.)
7. Inspection agencies (PTAC, MFPEA, SGS, etc.)
8. Major NGOs in agricultural sector (PACT, OISCA, etc.)
9. Private agri-business companies (MAPCO, Yuzana Group, Awba Group, CP Group, etc.)

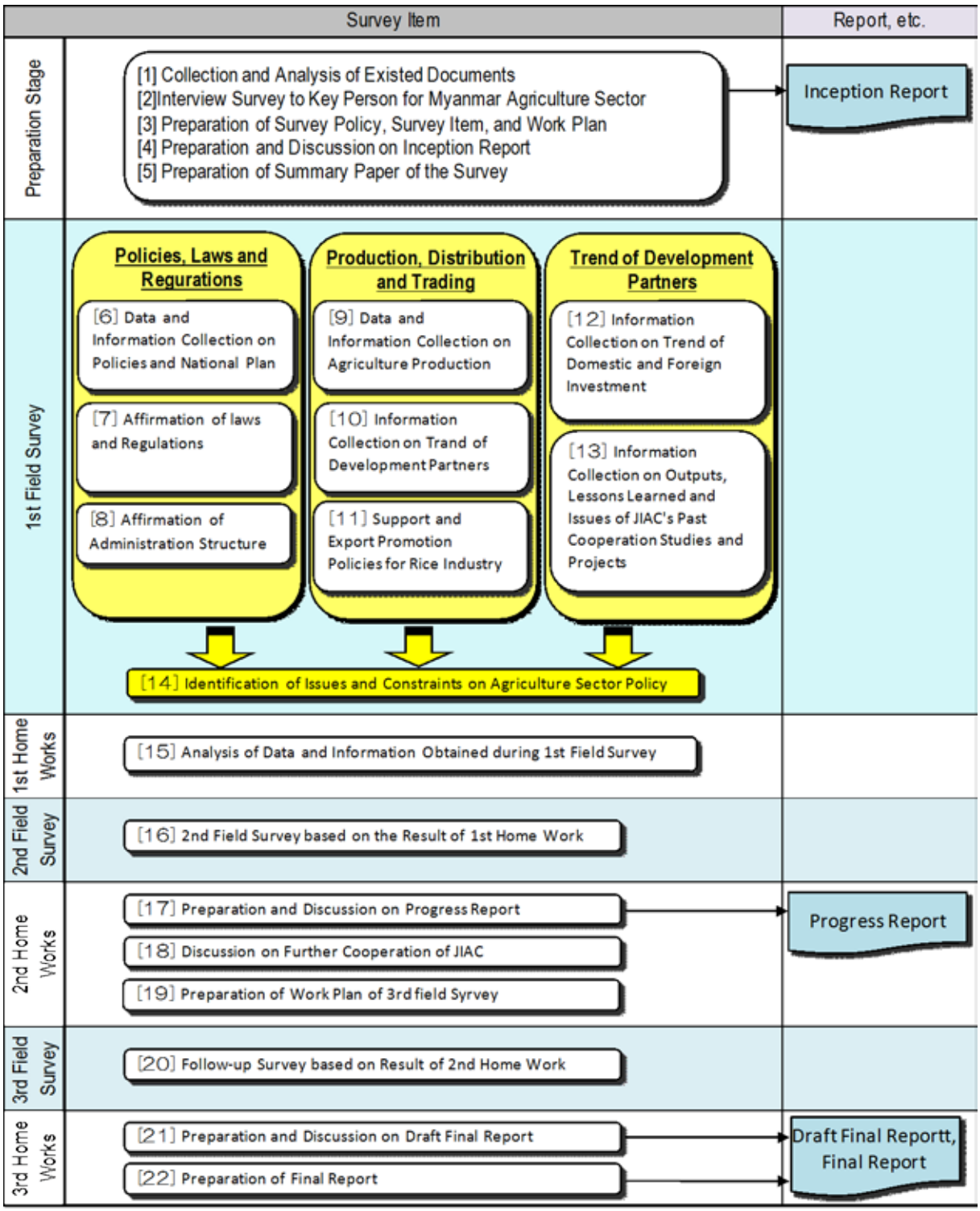
1.4 Related Agencies

No particular counterpart organization is specified as far as this Study is concerned. However, the surveyors of this Study have closely contacted with the staff of Ministry of Agriculture and Irrigation, and those of 10 departments under the umbrella of the said ministry, so as to strive for extracting necessary information therefrom.

1.5 Scope of the Survey

The schedule of the work of this Study for collecting and identifying information is shown in a flowchart in the following page.

Figure 1-2 Flow Chart of the Data Collection Survey on Agriculture Sector in Myanmar



CHAPTER 2 DATA COLLECTION SURVEY

2.1 National Policy and Development Plan

2.1.1 National Comprehensive Development Plan

The national policy/development plan in Myanmar is composed of the National Comprehensive Development Plan (2011-2012 to 2030-2031) and the Fifth Five-Year Plan (2011-2012 to 2015-2016). The Fifth Five-Year Plan was drawn up and submitted to the congress for discussion as of June 2012. Up to now, related ministries and local governments have been revising the plan in response to the comments by the Congress.

Based on the President's address on 19, June 2012, the State will carry out reviewing and drawing the 30-Year Plan after getting an approval from the Congress. The Agriculture Development plans are included in the National Comprehensive development plan as one of sector-wise development. Relation among the long term/ short term development plans and Rural Development/ Poverty Alleviation Plan are summarized as follows;

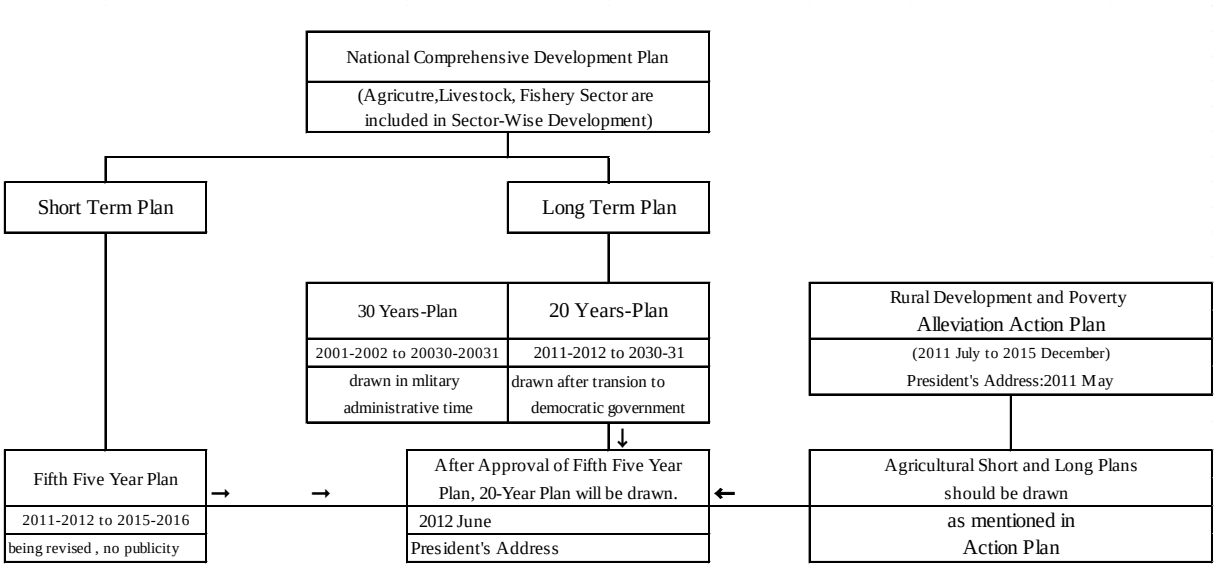


Figure 2-1 National Comprehensive Development Plan

2.1.2 Rural Development and Poverty Alleviation Action Plan

Myanmar is an agriculture country, where the 70 % of the total population are living in the rural areas and agricultural sector is the backbone of its economics. The President of the new government delivered an address on "the National and People-centered Development Action Plan for Rural Development and Poverty Alleviation." at the national workshop held on May 20 to 22 2011. In this plan, the development of agricultural, livestock and fishery sectors, food security against the climate change, income generation for local people and poverty alleviation are prioritized issues to be tackled as the national level.

In response to the President' policy, the Ministry of National Development and Economic

Development established the Central Committee for Rural Development and Poverty Alleviation (CCRDPA). Under the CCRDPA, the Work Committee and Sub-Committee at each State/Region were constituted in order to formulate and implement the action plans.

(1) Objective of Action Plan

Based on the Millennium Development Goals in Myanmar, the action plan for the rural and poverty alleviation will be implemented so effectively and efficiently as to reduce the 50 % of the current poverty rate until 2015, in other words, the 32 % of poverty rate in 2004-2005 will be reduced to 16 % in 2014 to 2015. The following table shows Goals of Poverty Alleviation for Each State /Region.

Table 2-1 Goals of Poverty Alleviation for each State/Region

State/Region	Poverty Rate(%)	
	2005	2013 Goal
1. Kachin State	44.2	22.1
2. Kayah State	33.6	16.8
3. Kayin State	11.8	5.9
4. Chin State	73.3	36.7
5. Sagaing Region	26.6	13.3
6. Tanintharyi Region	33.8	16.9
7. Bago Region	31.6	15.8
8. Magway Region	42.1	21.1
9. Mandalay Region	38.9	19.5
10. Mon State	21.5	10.8
11. Rakhine State	38.1	19.1
12. Yangon Region	15.1	17.5
13. Shan State	46.1	23.1
14. Ayeyarwady Region	29.3	14.7
Union	32.1	16.1

Source: Action Plan for Rural Development and Poverty Alleviation (2011)

(2) Policy Issues, Activities, Organization and Support

The following Table 2-2 shows the summary of policy issues, activities, organization and support for implementing the Action Plan for Rural Development and Poverty Alleviation.

Table 2-2 (1) Political Issues, Activties, Organization, Support for APRDPA

Political Issues	Activties	Gragazation and Support
Development of Agricultural Production Sector Development	1. To increase income through improving agricultural productivity (rice, pulses, maize, sesame, vegetables) ① Modernized varieties/high yield and margetable seeds ② Application of GAP ③Technical Trainingd for Sowing toPost Harveting ④Promotion of modern agricultural mechniztion ⑤Provision of fertilizer,pesticede ,initial fund ⑥Water supply for irrigated area ⑦Improvement of milling technology ⑧Collectio of market information 2. To generate job-opportunities from the non-agriculture sector ①Non-agricultural bisiness bu small-scale livestock and fisheries ②Managing general store ③Managing Small -scale shop ④Promoting cottage industries producing mats &baskets	**Central Level** MOAI: Agricultural production developemnt sub-committee **State/Regional Level** State/Region: Agricultural production implement sub-committee **Twonship Level** Township Agricultural porduction development organization **Village Level** Township Agricultural porduction development organization **Support** ①Production cost of rice, maize and pulses will be paid in advance with 2%of monthly interest rate. ②Studing the possibility of farm machines by monthly installments ③Privare companies: purchasing fertilizers from state owned enterprizes and distribution of fertilizers by monthly installments ④Distribution of high qualified seeds by private companies through the barter trading system ⑤Rental system of farm machines fortilling &levelling
Livestock and Fishery Producttion Sector Development	① Selection of complexed farming areas to be implemented ②Collection and distribution of improved varieties of lievstock and fisheries ③Implementating outcomes of research and development through extension services ④Dissamination of information and extension services services against desease and natural disasters ⑤Provision of private microfinace agencies ⑥Encouraging and promting investment by private sector	Central Level MoLF: Livestock and fihery development sub-committee **State/Regional Level** State/Region: livestock and fishery development sub- **Twonship/Village Level** Township livestock and fishery development **Spport** ①Backyard farming for local people ②Feeding livestock related to complexed farming ③Promotion of one-village-one product campain for livestock and aquaculture feeding ④Implementing commercial scaled livestock and fishery feeding at township and viaage level
Small Scale Rural Industry Development	①Establishment of small scale industry by using local materials and skill ②Carrying out the training and OJT to improve technologies and knowledge ③Imtroduction of high quality and product with low cost ④Encouraging high qualified packaging technology ⑤Encouraging improvement of markets and marking ⑥Improving investment conditions between companies and villages	**Central Level** MOC: Small Scale industry development sub-committee State/Region Level Rural small scale development implementating Sub- **Support** Food production in cooperation with groups

Source: Myanmar Rural development and Poverty Alleviation Action Plan, 2011

Table 2-2 (2) Political Issues, Activties, Organization, Support for APRDPA

Political Issues	Activties	Gragazation and Support
Rural Cooperative Development	1. To organize rural cooperatives based on the policy	**Central Level** MoCo: Rural cooperative development sub-committee **State/Regional Level** State/Region: Rural cooperative dvelopment implement sub-committee **Twonship Level** Twonship organization **Village Level** Village organization
	①Organizing rural coopertives with farmer's participation ② Encouraing farmers'groups to give opportunities to select key persons and to manage the cooperative fairly ③To limit the opportunities to receive the profit from the deposit ④To share profits from group's activities through the decision by cooperative members ⑤Providing education in connection with cooperative activities ⑥To make good relationship with domestic and overseas cooperative societies	
	2. Village Organization(Village Group)	
	①Cooperative societies only work for their own socio-economic development ② Cooperative societies work for achieving their high living standards ③ Members of the societies participate in social activites ④Members of societies contribute to providing labor force and propertyand carry out works only for members	
Rural Socio-Economic Development	① Improvement of rural transportation ②To secure domestic and irrigation water ③To improve education and socio-economic situations ④Improvement of school-facilities ⑤Training teachers to enhance their capacity building ⑥ To improve rural insurance services and to prevent local people from diseases ⑦Toimprove tele-communication systems in rural areas ⑧To carry out vacational training on village level ⑨To transfer operation and maintenance method of farm machineries ⑩To disseminate technologies for increasing production ⑪To promote small scale industries and investment ⑫To support the aged, child and disabled person ⑬To provide rural socio-economic situation, agricultural technologies, market information, weather news	**Central Level** Ministry of Information: Rural cooperative development sub-committee **State/Regional Level** State/Region:Rural socio-economic development implementation sub-committee **Support** To promote the socio-economic development in rural areas
Rural Energy Development	①To develop and use solar enegy ②To develop and use the wind power generation in the coastal areas ③To exploit hydro-power gneration in areas with abundant water resources ④Encouraging bio-enegy utilization ⑤To exploit bio-mass enegy by use of agricultural waste ⑥To establish the system for developing and using rural enegies at village level	**Central Level** Ministry of 2nd Industry:: Rural energy development sub-committee **State/Region Level** State/Region Rural Energy development implementating sub-committee **Support** To support the implemetationof rural enegy

Source: Myanmar Rural development and Poverty Alleviation Action Plan, 2011

Table 2-2 (3) Political Issues, Activties, Organization, Support for APRDPA

Political Issues	Activties	Gragazation and Support
Eviromental Conservation	① Promotion of enviromental conservation activitiesl on village level ②Utilization of agriculture and livestock technlogies and knowledge being adaptable to climate change ③Setting-up of weather forcasting system ④ Provision of common forest, agroforest, forest used for charcoal making for enviroment conservation and protection from forest destruction ⑤Sharing knowledge on environmental conservation	**Central Level** Ministry of Environmental Conservation and Forest : Enviromental conservation sub-committee **State/Regional Level** State/Region: Enviromenral conservation implementation sub-committee **Support** To support the implemetaion of enviromental
Private Microcredit System Development	① Development of existing microcredit system ②Procurement of capital from the private sector in case of capital deficit occurred in the development committee ③Provision of low interest loan for shop owner, vendor ④Coordinating with interantional agencies, NGO, INGO in connection with microcredit management	**Central Level** Ministry of Finace and Revenue : Private microcredit system development sub-committee **State/Regional Level** implementation sub-committee **Support** Establishment of microfinance system to supply the loan being equivalent to three times of capital

Source: Myanmar Rural development and Poverty Alleviation Action Plan, 2011

(3) Latest Movement for Rural Development

Rural development function had been under the jurisdiction of Ministry of Border Affairs, but is shift on September 2013 to former Ministry of Livestock and Fisheries, which in turn change its name to Ministry of Livestock, Fisheries and Rural Development (MOLFRD). After the shift, new movement for rural development has taken place as follows.

To reduce poverty rate from 26% in 2010 to 16% in 2015, MOLFRD developed a strategic framework for rural development, which includes 5 strategies for poverty alleviation[1].

1) Targeting Strategy

According to a poverty profile developed by UNDP in 2010, number of people under the poverty line of Myanmar, 300,000 Kyat/ year, is estimated at 16 million, which accounts for 26% of national population. To reduce the poverty headcount ratio to 16%, 6 million peoples have to be pull out of the poverty line. For this purpose, based on the UNDP's poverty statistics, 28 districts was preselected as strategically important target areas.

2) Synergistic Strategy

This strategy suggests developing two different levels of rural development plan, which includes participatory development plan at village level and decentralized regional plan at district level aiming at synergize the multiplier effects to reduce poverty. Purpose of the micro-level participatory village plan is to increase per capita income of rural poor by implementing a set of strategies including a) increasing working capital, b) providing livelihood assets for reducing the living cost, c) enhancing income-generating opportunities, d) upgrading village infrastructure, e) restoring ecological stability and productivity, and f) improving community resilience and adaptive management to mitigate the risks of climate change and social conflicts.

[1] "Highlight of Strategic Framework for Rural Development", Ministry of Livestock, Fisheries and Rural Development, 2013

On the other hand, objective of decentralized district-level development plan is to support generating development benefits from the process of village level participatory planning in view of (1) promoting investment in sustainable land-based economic development, (2) connecting rural villages with development center through better infrastructure (3) enhancing rural community's access to one-stop public services such as citizenry registration, agriculture/livestock extension, land registration, professional health care, etc. (4) improving market linkage and value chain development, and (5) developing entrepreneurship skill and management.

3) Sustainable Financing Strategy

To assure financial resources for rural development sustainably, the strategy suggests establishment of Township Development Fund (TDF) and District Development Fund (DDF). Ideal financial resources for the funds includes utility and property tax, budget allocation from Union government and various department, private sector's investment and donation from individuals and institutions.

4) Collaborative Strategy

To assure all inclusiveness of multi-stakeholders in joint implementation of development activities, the strategy suggests creating consortium of development partners at national, regional and township level, as a common platform for all to participate. Also, establishment of communication channel to bring voices from the grassroots or bottoms up to the decision maker at national level is important, in addition to coordination among stakeholders and sharing learning from best practices and lessons in development intervention.

5) Strategy of Good Governance Process for Rural Development

The strategy of good governance process for rural development includes transparency, accountability, active participation effectiveness and efficiency, equity, rule of law, and responsiveness.

2.2 Policies on Agriculture, Livestock, Fishery Sectors

2.2.1 Agriculture Sector Development Policy

The National Comprehensive Development Plan consists of sector development plans. The President laid down the guideline for the Union ministries to draw the sector development plans through holding regional workshops at Regional and State levels and to bring in voices and suggestions from participants. According to the guideline, Ministry of Agriculture and Irrigation has conducted the workshop for agricultural development in 2012 July to November. Based on the outcomes of the discussion, the workshop has drawn policies and action plans for agriculture projects under the long and short term development plan. Hereinafter, the long term development plan of agriculture sector is referred to as "20-Year Development Plan in Agriculture Sector", whereas that of short term development plan is referred to as "Fifth Five-Year Development Plan".

1) 20-Year Development Plan in Agriculture Sector (2011-2012 to 2030-2031)

The President of the new government delivered an address on the necessity of setting up of immediate short and long-term agriculture sector development plan in accordance with the following mission and vision. The 20-Year Development Plan in the Agriculture Sector (2011-2012 to 2030-31) was established in compliance with the directions by the President.

Sustainable Agricultural Development Mission

- To get the most of the market share at regional and global markets for important crops and agro-based, value-added products
- To promote the food security for rural people
- To increase green-growth production in conformity with natural environment

Vision

- To keep a better competitive advantage than the developed neighboring countries
- To provide knowledge and technology know-how for rural people being equal to the developed neighboring countries in ability
- To increase rural industrial and social infrastructures just as neighboring countries do.

The 20-Year Development Plan in the Agriculture Sector established by MOAI is summarized in Table 2-3.

Table 2-3 (1) 20-Year Development Plan in Agriculture Sector (2011-2012 to 2030-20131)

Major Policies		Action Plan
Enhancement of Agricultural Productivity	**High yield and quality seeds production and distibution**	(1)To cooperate with foreign seed companies for seed protection technologies inculding breeder seeds from advnaced countries for quality seed, inchuding rice, production and distribution (2)The 100% insurance of seed quality control has been imposed, regions and states authrities are to monitor and implement, according to the international standard, the packing system, cold storage facility and systematically transportation, distirbution and selling including seed processing plant. (3)To encourage the private sector companies to be effectively cooperate and invest for the essential needs of State in quality seed production (4)To encourage the private sector to emerge the agricultural companies/enterprises for the total solution,it is from qulity seed production to marketing (5)To effectively conduct the building up the appropriate quality seed production zone in respective regions and states.
	Agricultural inputs (Utilization of natural inputs)	(1)Existing state own fertilizer factories with full ability are produce the required inputs for agriculture sector, to be conducted the effectively distribution (2)There are immediate needs for agriculture sector which is to be effectively applied natural gas from state in fertilizer production that is to be got the quick win for nationalities (3)According to the recognized standard of fertilizer are conducted to be able to produce, and sell, that can be used trust and cheap prices in local and to implement as a priority activity to emerge the fertilizer factories for N,P,K by domestic and international invetsment. (4)The Ministry of Commerce has to lay down an explicit plan of action for big private companies they are to import and distribute the fertilizer that is insurance quality and price, while fertilizer requirement is not immediately produced and distributed yet as a priority activity in local. (5)Regions and State authorities are to investigate and take effective action agaist unlawful distribution of unqulified fake chemical fetilizers and pesticides at district and township levels, to protect the effected farmers.
Enhanment of Technologies and Extension Srervices	**Agricultural Mechanization （Reform the conventional farrming to mechanized farming)**	(1)To reform the land from the inconsistent of firms to acre plot/hectar plot by coordinating with the government, private and farmer sectors. (2)To encourage to private sector for more produce the modernize machines it canbe more used in every stage of pre-harvest and post-harvest. (3)To encourage exporting the modernize farm machines by tax reduce/exception. (4)To hold the trainings of applied and maintenance of farm machinerries for farmers at Mechanization Deapartment level and to hold the replicating cources by private sector as Regions and States-wise. (5)While the private sector can not expand the farm services, State has to be effectively support to get the local and international assistance for thr fully efficient farm machinery in spite of the existing over age of machines.

Table 2-3 (2) 20-Year Development Plan in Agriculture Sector (2011-2012 to 2030-20131)

Major Policies		Action Plan
	Promotion of Irrigated Farming System (Reform the rain-fed conventinal farming to irrigated farming)	(1)To acievethe renovation of existing reservoirs and dams and the constrction of new reservoirs and dams in time by financial providing of state/government budget, and to execute with the way of catch the international loan/grant if activities has not been provided the financial by State/ (2)To manage in right time the teratment for natural disasters, and such as drought/flood etc., is occurred due to the climate change, and to conduct the drought monitoring applied research system in dry zone area. (3)To conduct to produce the electric power through the constructing the small gnerators in irrigation projects, on the other hand, it is to help the lighting of village for rural development (4)To bring into use of bio-enegy rice husk based gasifier power plant in the lifting of water projects.
	Research and Development (Research and development for advanced agricultural technologies in agriculture sector)	(1)To implement and invest the necessary financing and infrastructure for effective research activities to Department of Agriculture Research including regional, state-wise and varietal-wise. (2)To implement sector-wise by effective using the echnologies practically with research outcome,as an aim, in classroom and laboratory without stop at research level to approach farm level in agricultural development program (3)To allow reserachers to aboroad foreign countries forexchange technical experience by specifically selected techniquique that would be applied for nation and agriculture sector development. (4)To harmoniously implement regions and states-wise by the model farming of farmer field school, that is mechanized farming for establishment fo small scale pilot project that decentralized Nay Pyi Taw council area, which is Union Territory for research and development. (5)To cooperate state and private sectors for disseminating the agricultural technologies from research to farmer (6)To establish the farmer training center in regions for dissemination technologies to rural communities and to create opportunities that would be studied on the advanced agricultural technologies for rural young group. (7)To enhance invetsment fr necessary information and communication technology (ICT) and infrastructure for human resource development in agricultural education sector. (8)To provide the necssary investment for improvement research and developemnt of appropriate cropping system, varieties and agricultural practice for occurred natural disasters due to climate change. (9)To accomplish engaing with advanaced countries and international organization to get technologies assistance for resistant varieties and early warning system.
Improving Acess to Market	**Sustainable Market Developing （High Value-added agricultural products and promotion of agro-based industry)**	(1)Ministry of Commerce has to effectively manage fo exporting the agricultural value-added products in spite of the agricultural raw products. (2)Livestock sector has to fulfill the consumption demand of milk, egg and meat by the grass root level people for their nutrition and growth, while agriculture sector is to supply the need of the animal feed. (3)To reduce unnecessary import of edible oils, Ministry of Commerce has to think for the long-term for small scale livestock and agriculture related enterprises to be able to use by-products for animal feed. (4)To encourage the buiding of the modernized rice mills and edible oil mills, to promote the quality of the old age of rice mills for export the milling quality rice and edible oil mills, and to porduce the quality of edible oil in spite of sell raw products. (5)To build agro-based industry as a down stream industry: the re-milling plant, prossing plant, refinaery plant etc., that is to produce the advanced valu-added agricultural products from industrial crops, sugarcane,rubber, and palm oil including pulses etc.,. (6)To encourage promoting snall and medium scale agro- based industries, it is procuced from by-products to valu-added products. (7)To conduct to free flow from local and foreign invetsment for downstream industries such as palm oil industry,rubber industry and sugarcane industry, etc.,. (8)To encourage to produce not only priority crops; rice, pulses and oil palm, etc., but also the value-added products such as the canned juice and wine, etc., from vagetable and fruits. (9)To support the contrsct farming system cooperate with farmers, local and foreign enterprises including Foreign Direct Invetsment for adequately collecting the required raw . quality products of crops. (10)To support to more compactly cooperate with the cooperative and private sector than present in the total solution of commodity supply chain for good market price.

Table 2-3 (3) 20-Year Development Plan in Agriculture Sector (2011-2012 to 2030-20131)

Major Policies		Action Plan
Improving Acess to Market	**Sustainable Market**	(1)Agricultural products are to be produced , following with ASEAN and international standard for competition in the intenational market. (2)Ministry of Commerce has to implement for signing the agreements not only between private sector but also government to government for trade of valu-added agricultural products and for securing foreign market. (3)Role of quality control system must be sepcial managed in enterprise and farmer sector wise to keep the reputation for agricultural products and good price. (4)Producers has to manage for convenient sistuation acoording to necessary change of nature of market and market price; (5)Existing laboratories will be upgraded and the advanced laboratories have been established forplant quarantine and sanitary and phtosanitary in accordance with the the international standard of agricultural products. (6)Technologies assistance would be to obtain from national, internationaal workshops, trainings and intrenational research institutes for using the advanced technologies in accordance with the international standard.
Agricultural Statistics	**Upgrading Accuracy of Settlement and Land Record in Agricultural Statistics**	(1)Issuing the certificates of Land Use Right Certificates and Land Use Right Registration for individual farmer. (2)Establishment of Database System for Land Tenure Registration by the provision and technical cooperation with international organization in long run. (3)Ministry of National Planning and Economic Development has to correspond foreign countries for assistances of financial and materials including ssatellite by advanced technology for accuracy of agricultural statistics.
Agricutural Laws and Regulations	**Revised Evaluation of Agricultural Laws and Regulations Reviewing and evaluation of (existing agricultural laws and regulations inline with current economic sistuation)**	(1)To cooperate with regions and states government and relevant department for awareness of public and farmers on provisions of farm land law and regulation and management for vacant, fallow and virgin lands of the laws and regualtions. (2)To revise and evaluate on the provisions of lawas and regualtions of taxation of land and irrigation, quarantine law, and lawa of Myanmar Agricultural Development Bank, if necessary for amendment in line with current sistuation. (3)To cooperate and coordinate with relevant instituions for provisions of new plant variety protection law, biosafety enact in time which is left to proceed. (4)To cooperate with regions and states government and relevant department to be able to use the qualify fertilizers and pesticides for farmers,to undertake the provision of laws, and field inspection. (5) To cooperate with the relevant ministries to generate rural-base small and medium enterprises law, hereby contributing to the creation of job opportunities in rural area. (6)To act the provisions of wholesale market law tht is one of the ways for reducing the transaction cost in commodity supply chain.
Information and Media	**Importance of Information and Media**	(1)To enhance for farmer activity participation in the reform strategies and improvement for agricultural sector in countrywide by media, that is very important factor for agricultural development in State (2)To manage dissemination of weather forecast and information to raural area by television program due to agricultural products are depending on climatic condition. (3)To coordinate and collaborate with the Minstry of Informaton dissemination the advanced technologies of agriculture and livestock to farmer by farmers' channel of television program. (4)To plan news,titles, perspective and progarms of rural and agricultural sector development into newspaper and radio, television progarms. (5)To encourage the developemnt of journal,paper which will be distribute the information of agricultural market news, agricultural technologies, management and maintenance technologies of farm machinery, irrigation rules and etc. to farmers. (6) To coordinate the relevant institutions for extending agricultural progarm into film and video.

Source: National Comprehensive Development Plan, Agricultural Sector Development, MOAI,2012

2) Fifth Five-Year Development Plan (2011-2012 to 2015-2016)

According 2010-2011 fiscal year, Gross Domestic Product (GDP) of agriculture products would be expected to increase average (1.8%) per year in Fifth Five-Year short term plan (2011-2012 to 2015-2016). MOAI has adopted the policies, programs and goals as shown in Table 2-4, 2-5.

Table 2-4 Fifth Five-Year Development Plan (2011-2012 to 2015-2016)

Mayor Policies		Program
Enhancing Agricultural Productivity	・To produce high yielding varieties and good quality seeds ・To encourage transformation from conventional farming to machanized farming	・Promoting and utilization of high yield and good quality seeds ・Increasing of irrigated area ・Utilization of machines in agricultural production ・Application of agricultural inputs such as irrigation water, chemical and natural fertilizers effectively
Strengthening of Research & Development and Extention Services	・To generate agricultural technicians ・Training and dissamination of agricultural ・To implement research and development activities for sustainable development	・Extension of modern agro-technique ・New research and development ・Generating of agricultural technicians
Strengthening of Market	・Developing and strengthening of markets ・To assist farmers to get fair price on their produce ・To assist in lowering the production costs	・Reduction of production costs and transactional cost along with the supply chain ・Establishing to obatain benefits and sustainable market for crops ・Developing the agro-based industry
Promotion of Investment	(nofound in policies)	・Promotion of invetsment by private sector in agro-production
Protection of Farmers	・To protect farmers' rights and benefits	・Lending of agricultural loan fro crop production
Agricultural Laws and Regulations	(nofound in policies)	・Drawing the revised act in line with current situation
Agricultural Statistic	(nofound in policies)	・Establishing the accracy of agricultural statstics
Rural Development & Poverty Alleviation	・To suppot rural development and poverty alleviation activitiest through developemnt of agricultural sector	・Pormoting capacity building on staffs and effective and efficient of organization for more collaboration with regional and international organization

Source: Based on 20-Year Development Plan in Agricultural Sector (2011-12 to 2030-31), MOAI, the JICA Survey Team compiled the Five-Year Devevelopment Plan (2011-12 to 2015-16)

Table 2-5 Target Production in Fifth Five-Year Development Plan (2011/12－2015/2016)

a) Sown Area of Major Crops

Target Aera for Ten Major Crops (Million ha)

No.	Crops	2011/2012	2015/2016
1	Rice	7.80	7.83
2	Maize	0.40	0.43
3	Groundnut	0.89	0.91
4	Sesame	1.62	1.65
5	Sunflower	0.72	0.74
6	Black gram	1.04	1.04
7	Green gram	1.12	1.14
8	Pigion pea	0.64	0.65
9	Sugarcane	0.16	0.16
10	Long stable cotton	0.28	0.28
	Ten principal crops	14.67	14.83
	Other crops	8.20	8.09
	Total sown areas	22.87	22.92

Total and Net Sown Areas (Million ha)

Year	Total Sown Area	Net Sown Area
2011-2012	22.87	11.95
2012-2013	22.82	11.97
2013-2014	22.65	12.03
2014-2015	22.77	12.1
2015-2016	22.92	12.17

b) Yield and Production for Rice

Year	Yield (t/ha)	Production (million t)
2011-2012	4.12	32.19
2012-2013	4.18	32.73
2013-2014	4.23	32.98
2014-2015	4.26	33.34
2015-2016	4.28	33.52

c) Irrigated Area

Year	No. of Dam/Pond	Bebeficial Area (Million ha)	Irrigated Area (Million ha)
2011-2012	415	13.73	2.29
2012-2013	421	13.74	2.31
2013-2014	424	13.57	2.33
2014-2015	433	13.7	2.35
2015-2016	443	14.84	2.36

d) Utilization of Farm Machines

	Unit (1,000)		
	2010-2011 based year	2015-2016 end year	Annual Growth Rate (%)
Bullock	10,316	10,852	1.0
Tractor	11	12	1.8
Power tiller	160	168	1.0
Harvester	2	3	8.4
Thresher	42	45	1.4

e) Development of New Agricultural Land

New Agricultural Land (ha)					Expansion of Upland (ha)
Year	State	Private	Foreign Assistance	Total	
2011-2012					
2012-2013					
2013-2014	1,133	2,024	18,212	21,368	303.53
2014-2015	1,133	2,024	18,212	21,368	303.53
2015-2016	1,133	2,024	18,212	21,368	303.53

f) Agriculture and Development Loan

Year	Loan	Investment	
	(Million kyat)	(Million kyat)	US$
2011-2012	386,225	186,692	14,633
2012-2013	413,920	522,039	61,765
2013-2014	433,418	306,788	22,116
2014-2015	464,753	194,487	32,164
2015-2016	496,786	117,781	30,812

g) Plan of Distribution of Good Quality Seed for Major Crops

Crops	Unit	2010-2011 based year	2015-2016 end year	Annal Growth Rate (%)
Rice	t	2,540	3,785	8.3
Wheat	t	9.29	13.08	7.1
Pilses	t	98	447	35.5
Groundnut	t	1.37	5.13	30.3
Sesame	t	11.81	62	30.4
Sunflower	t	5.71	44	50.1

h) Utilization of Various Fertilizers

	Unit	2010-2011	2015-2016	Annal Growth Rate (%)
Various fertilizers	1,000MT	299	1790	43.0

Note: Industry chemical, organic and other fertilizers.

2.2.2 20-Year Development Plan in Livestock and Fishery Sector (2011-2012 to 2030-2031)

1) Policies

Based on the information obtained from the Ministry of Livestock, Fishery and Rural Development (MLFRD), policies in 20-Year Development plan in livestock and fishery sector are as follows;

a) To encourage the expansion of high breed livestock and aquaculture
b) To promote all round development in the livestock and fishery
c) To increase meat and fish production for domestic consumption and share the surplus with neighboring countries
d) To enhance the investment opportunities in livestock and fisheries sector
e) To expand prawn breeding farms
f) To prevent the natural resources from in land offshore
g) To speed up the momentum of inland fishery sector in order to fulfill the domestic consumption
h) To upgrade the socio-economic status of livestock and fishery committees

2) Livestock Sector Short Term Plan (2011-2012 to 2015-2016)

a) To improve the animal population resources and livestock production
b) To conserve the genetic resources and proper utilization of indigenous breeds
c) To control the animal disease
d) To produce the required biological products against infectious disease
e) To transfer the appropriate technical know-how to farmers

3) Fishery Sector Short Term Plan (2011-2012 to 2015-2016)

Freshwater Fisheries

a) To use the system of culture base capture on fishery

b) To manage the protection of water pollution and good water current by season changes in leasable area
c) To protect and let free from harvest the fish un mature and un marketable size
d) To stock the fish seed yearly and use the no harmful species
e) To stock the fish species without danger to local species more frequency in to the water body of river, creak, dam and reservoir
f) To survey to fishing village and organize farmer to prevent poaching
g) To refrain from harvesting fish during close season and prohibited area
h) To make the data collection and record for fishery resources management and fishery management on socio-economy of fishermen and fisheries indication as fish species, fish product, fish size, etc.

Marine Fisheries

a) Implementation on systematically management and fish harvest from the whole water body by maximum sustainable yields calculation
b) Priority implementation on maintaining the water resources to reduce water pollution by damage natural resources for decreasing natural resources for fish habitant change location by damage on sea grasses and coral
c) Marking the area of fishing ground of onshore and offshore by present situation, permission the license with one of the period for fishing and fish implement systematically

2.2.3 Value-added Production

"Building up of the value-added agro-products production and agro-based industries" is one of 11 priority policies of Agriculture Sector as stated in the draft National Comprehensive Development Plan. For this purpose, 10 Action Plans are indicated in the plan.[2]

a) Ministry of Commerce has to effectively manage for exporting the agricultural value-added products in spite of the agricultural raw products.
b) Livestock sector has to fulfill the consumption demand of milk, egg and meet by the grass-root level people for their nutrition and growth, while agriculture sector is to support the need of the animal feed.
c) To be reduced un-necessary import of edible oils, Ministry of Commerce has to think for the long-term for small-scale livestock and agriculture related enterprises to be able to use by-products for animal feed.
d) To encourage the building of the modernized rice mills and edible oil mills, to promote the quality of the aged rice mills for exporting the milled quality rice and edible oil mills, and to produce the quality of edible oil in place of selling raw products.
e) To build agro-based industry as a downstream industry: the re-milling plant, processing plant, refinery plant etc. that is to produce the advanced value-added agricultural products from

[2] National Comprehensive Development Plan (Agriculture Sector), 11.b. Plan of Actions, (3)

industrial crops, sugarcane, rubber, and palm oil including pulses etc.

f) To encourage small and medium scale agro-based industries, utilizing from by-products to produce value-added products.
g) To foster free participation of foreign investment for downstream industries such as palm oil industry, rubber industry and sugarcane industry, etc.
h) To encourage to produce not only priority crops: rice, pulses and oil palm, etc. but also the value-added products such as the canned, juice and wine, etc., from vegetables and fruits.
i) To support the contract farming system in cooperation with farmers, local and foreign enterprises including Foreign Direct Investment for adequately collecting the required raw quality products of crops.
j) To support close cooperation with cooperatives and private sector than present state in the radical solution of commodity supply chain for decent market price.

2.2.4 Agricultural Marketing

To expand share of agricultural products in domestic and international market, the draft National Comprehensive Development Plan put an importance on value-adding and quality improvement of agricultural commodities. The action plan for value-adding is shown in (3) Value-added Production. The action plan for quality improvement is shown in the section of sustainable market in the draft National Comprehensive Development Plan. 6 factors for development of sustainable market in the Action Plan are as follows.[3]

a) Agricultural products are to be produced following with ASEAN and international standard for competition in international market.
b) Ministry of commerce has to implement for signing the agreements not only between private sector but also government to government for trade of value-added agricultural products and for secure foreign market.
c) Role of quality control system must be special managed in enterprise and farmer sector-wise to keep the reputation for Myanmar's agricultural products and adequate price.
d) Producers have to manage for convenient situation according to necessary change of nature of market and market price;
e) Existing laboratories will be upgraded and the advanced laboratories have been established for plant quarantine and sanitary and phytosanitary (SPS) in accordance with the international standard of agricultural products;
f) Technologies assistances would be to obtain from national, international workshops, trainings and international research institutes for using the advanced technologies in accordance with the international standard.

To activate agricultural market, the government has taken several measures including liberalization of

[3] National Comprehensive Development Plan (Agriculture Sector), 11.b. Plan of Actions, (9)

production and sales of rice, privatization of import and sales of fertilizers and pesticides, abolishment of the government procurement of industrial crops, supporting establishment of associations for products production and trade, and information collection and dissemination for market trend and prices.

Regarding agricultural products marketing, inauguration of ASEAN Economic Community (AEC) in 2015 will be a turning point for Myanmar. After the AEC inauguration, agricultural trade will be liberalized among ASEAN countries, and Myanmar's agriculture, livestock and fisheries sectors will be involved in the competitive international market. Therefore, establishment of production system based on the ASEAN certification standard and ASEAN GMP Guideline are listed in the top of the action plan.

2.2.5 Export and Import of Agricultural Products

To promote export and import of agriculture products, the government promotes abolishment of export tax, and abolishment of import tax on agricultural inputs including machinery, fertilizers and pesticides, liberalization of agricultural products export. In addition, Ministry of Commerce is preparing administrative instruction of the Export Import Law 2012.

Furthermore, Department of Trade Promotion (DTP) was established in the Ministry of Commerce on April 1, 2013, absorbing staffs from former Myanmar Agricultural Produce Trading (MAPT). DTP supports domestic traders to participate in trade exhibition organized by ASEAN-Japan Center and ASEAN-Korean Center, and organize trade fair and business matching under combined effort of UMFCCI.

Export tax was reduced from 10% to 7% on June 2011, in accordance with Kyat appreciation, and reduced again to 2% on August 2011.[4] According to DTP officials, export tax was abolished as of July 2013. However, some agricultural commodities including rubber, cotton, lacquer and dye for hide are still subject to taxation.[5] Also, import tax for agriculture purpose such as agricultural machinaries was abolished, and the tax for imported seed is exempted. But in either case, 5% commercial tax is subject to tax.

According to DTP officials, export of oil seeds and pulses, including brown sesame and groundnuts which had been priority edible oil to provide domestic markets, are already liberalized and export permission is not necessary. However, crop inspection before export is required to them. Import permission of fertilizers and pesticides are also not necessary, but quality certification issued by MOAI is necessary.

Import and sell of pesticides had been under control by the Government until 2995. After private sector participation was allowed, private firms including Myanmar Awba Group started importing and selling of pesticides and seeds. Trade of fertilizers was also liberalized on 2003, after the deregulation by the Government.

As of August 2013, those commodities required export or import certification and permission by the

[4] http://www.reuters.com/article/2011/08/15/myanmar-tax-idAFL3E7JF0XR20110815
[5] Interview survey to JICA Expert to Ministry of Finance and Revenue on August6, 2013

Government are as follows.

Table 2-6 Commodities Required Certification and Permission (Export)

	Description of Goods	Certificate/ Permit	Ministry/ Department
1	Rice and Beans	Pre-shipment Inspection Certificate	Authorized Quality Inspection Organization
2	Live Animals and Products	Veterinary Health Certificate	Livestock and Breeding & Veterinary Department
3	Medicine and Foodstuff	Food and Drug Administration	Ministry of Health
4	Pearls and Marine Products	Quality Inspection Certificate	Myanmar Pearls Enterprise
5	Agricultural Products	Phyto-sanitary Certificate	MOAI
6	Rubber Products	Export Permit	MOAI

Source: Ministry of Finance and Revenue

Table 2-7 Commodities Required Certification and Permission (Import)

	Description of Goods	Certificate/ Permit	Ministry/ Department
1	Medicine and Foodstuff	Food and Drug Registration Certificate	Food and Drug Administration, Ministry of Health
2	Live Animals	Veterinary health Certificate	Livestock and Breeding & Veterinary Department
3	Live Plants, Species, Fruits, Plants, etc.	Phyto-sanitary Certificate	MOAI
4	Essential Oil, Chemical Products	Test Result Certificate	Central Chemical Analysis Office
5	Fertilizers	Qualification Permit	MOAI
6	Pesticides	Fumigation Certificate	MOAI

Source: Ministry of Finance and Revenue

Ministry of Commerce is developing National Export Strategy under support of International Trade Center UNCTAD/WTO (ITC) and GIZ, and first meeting for the strategy was organized on July 2013. According to Department of Trade Promotion, purpose of the strategy is to enhance international competitiveness and to develop agricultural products for export based international market needs. The priority products include rice, pulses, fisheries products, textile and garment products, lumber and timber, and natural rubber.

2.2.6 Agricultural Credit

1) Institutional Credit

There are four national banks in Myanmar including Myanmar Agriculture Development Bank (MADB), Myanmar Economic Bank (MEB), Myanmar Foreign Trade Bank (MFTB), and Myanmar Investment and Commercial Bank (MICB). MADB is not under the supervision of Central Bank of Myanmar, but under the Ministry of Agriculture and Irrigation.

On the other hand, 19 private banks are operated in Myanmar which includes Global Treasure Bank Public Co., Ltd., a former Livestock and Fisheries Development Bank, Sibin Tharyar Yay Bank, Myanmar Industrial Development Bank. Current Financial Institutions Law does not allow foreign banks to formulate joint venture for banking business. However, the government makes it clear that foreign banks can operate after domestic banks gain enough competitive power against foreign banks.

Therefore, 17 foreign banks have open blanch office in Myanmar as of January 2013.[6]

Among domestic banks, Myanmar Agriculture Development Bank (MADB) and Global Treasure Bank Public Co., Ltd. provide financial services to agriculture sector. Most banks in Myanmar establish branch offices in urban area, but these two banks are operating in rural area to provide services to farmers and fishermen/ women. The Fifth Five-Year Development Plan stated that agricultural credit is one of five target sector to enhance. According to the plan, the government will increase by 1.3 times of loan amount from 2011-12 to 2015-16, as shown in table below.

Table 2-8 Target of Loan Amount of MADB

Year	Loan Amount (million kyat)
2011/12	386,225
2012/13	413,920
2013/14	433,418
2014/15	464,753
2015/16	496,786

Source: National Comprehensive Development Plan (Agriculture Sector)

To improve financial accessibility of farmers, the government allows cultivate right holders to collateralize the right after putting the Farm Land Law in force on March 2012.[7] Also, according to Myanmar Rice Federation (MRF), Ministry of Agriculture and Irrigation increase maximum loan amount from 20,000 kyat/acre to 100,000 kyat/acre (49,420 kyat/ha to 247,100 kyat/ha), as a substitute for making an end of the government support for fertilizer and seed procurement.

However, the loan amount is still limited and not enough for farmers since demand for loan is increasing in the agriculture sector. The agriculture sector is the largest industrial sector which accounts for 40% of GDP, and employ 54% of economically active labors, but loan amount for the sector is only 2.5% of total loan outstanding.[8] According to MADB, defect of loan for rice production is estimated at 170 billion kyat (173 million US$). Production cost of rice is around 250,000 - 300,000 kyat/acre (617,740 – 741,290 kyat/ha) in May 2013, but maximum loan amount to individuals is only 100,000 kyat per acre (247,100 kyat/ha).

2) Microfinance

Microfinance is one of eight priority subjects in the National Comprehensive Development Plan, and is an important financial scheme since it does not require mortgage. Concerning microfinance related laws, Microfinance Law (2011), and Microfinance Notification and Directives (2011) are existed.

Before the Microfinance Law come into effect, most microfinance institutions (MFI) had operated based on memorandum of understanding (MOU), but did not have legal status except PACT-UNDP. However, after the law, MFI can have legal status, and are not informal organization anymore. Regulatory authorities of the MFI are Microfinance Supervisory Committee (MSC) and Microfinance Supervisory Enterprise (MSE).

[6] Microfinance in Myanmar Sector Assessment, By Eric Duflos, Paul Luchtenburg, Li Ren, and Li Yan Chen, IFC Advisory Services in East Asia and the Pacific , Jan 2013 (P4)
[7] The Farm Land Law, Chapter III Rights of Person who has the Rights to carry out the Farm Land
[8] Microfinance in Myanmar Sector Assessment, By Eric Duflos, Paul Luchtenburg, Li Ren, and Li Yan Chen, IFC Advisory Services in East Asia and the Pacific , Jan 2013 (P8)

MSE examine MFIs in terms of legal status, capital fund, lending rate and savings rate, and have a right to issue a license for lending operation. According to MSE, 118 MFIs have the license as of November 2012, including 6 international NGOs, 9 domestic NGOs, 60 cooperatives, and 43 domestic firms.[9] Among licensed MFIs, cooperatives account for more than a half, but most of them carry on business in urban areas and do not have enough experiences in rural areas. United Nations Capital Development Fund (UNCDF) estimated that demand for microfinance is around US$ 1,000 million, but only 28% (US$ 283 million) is actually provided by MFIs.[10]

2.2.7 Private Investment in Agriculture Sector

1) 20-Year Development Plan in Agriculture Sector

The National Comprehensive Development Plan shows action plan for promoting private investment in agriculture sector. Those fields which are expected economic growth by inviting private investment are; agricultural inputs, industrial crops including natural rubber, cotton and sugarcane, agricultural processing, post-harvest, and advanced technologies. Five factors of promoting domestic and foreign investment are as follows[11].

a) To achieve inputs industry i.e. seed industry, fertilizer industry, pesticide industry and irrigation industry by the domestic and foreign investment for agriculture sector;
b) To implement domestic and foreign investment for processing to market which is fully investment for industrial crops such as palm oil, rubber, cotton, sugarcane and coffee by land reclamation, contract farming with farmers in crop production industry;
c) To invite domestic and foreign investment for value-added processing industry that is advanced rice mills and oil mills, by-product management industry, storage facilities of quality control, milling and packaging industry, advanced processing plant and final product industry;
d) To increase investment for advanced technologies and to cooperate with state, private sector, departments, cooperatives and non-government organization in agricultural research activities;
e) To implement to meet jointly the pre-evaluation and management for agriculture sector at present time due to becoming free flow from investment according to the ASEAN Economic Community agreement -AEC 2015.

2) Foreign Investment

There are three investment laws in Myanmar, including a) restriction of foreign investment based on laws and practices such as National Enterprise Law, Company Law and Conveyance Limitation Law, b) preferential treatment based on Foreign Investment Law, and c) preferential treatment to those firms

[9] Microfinance in Myanmar Sector Assessment, By Eric Duflos, Paul Luchtenburg, Li Ren, and Li Yan Chen, IFC Advisory Services in East Asia and the Pacific , Jan 2013 (P24)
[10] Microfinance in Myanmar Sector Assessment, By Eric Duflos, Paul Luchtenburg, Li Ren, and Li Yan Chen, IFC Advisory Services in East Asia and the Pacific , Jan 2013 (P8)
[11] National Comprehensive Development Plan (Agriculture Sector), 11.b. Plan of Actions, (7)

which moves in Special Economic Zone.[12]

Among them, the Foreign Investment Law came into effect on November 2, 2012 to promote foreign investment, and Myanmar Investment Committee has a right to provide permission to investment and provide preferential treatment to the permitted foreign companies. In addition, Foreign Investment Rule and Classification of Types of Economic Activities are given notice on January 31, 2013 by MNPED and MIC respectively.

The Classification of Types of Economic Activities classified by MIC defines those fields which restricted for investment, required joint venture with domestic firms, required government permission, required with conditionality, and field required environmental impact assessment (EIA).[13][14]

a) 21 fields for restriction of foreign investment
b) 42 fields to be permitted through joint venture with domestic firms
c) 115 fields to be required government permission
d) 27 fields to be permitted under certain conditions
e) 34 fields to be required EIA

According to the Classification of Types of Economic Activities, fields of investment related to agriculture sector are as follows;

Table 2-9 Classification of Types of Economic Activities

Field	Activities
Restricted (21 fields)	• Manufacturing and agricultural activities which against Chemical Fertilizer Law, Seed Law, and other agriculture related laws
JV is necessary (42 fields)	• Production and sell of hybrid seeds • Production and sell of indigenous species • Production and sell of grain processing • Production and sell of confectionery • Production and sell of foods and cans except milk and dairy products
Government Permission is necessary (115fields)	• MOAI: Production and sell of seeds, plant construction and production of chemical fertilizers • MOLFRD: apiculture and honey products production, production of fishing gear • MOI: Production and sell of edible oil (liquid and solid form) from vegetables and animals
Permitted with conditionality (27 fields)	• Breeding of buffalo and cattle • Breeding of sheep, goat, chicken and swine • Production and sell of animal feed • Production of preventive medicine and curative medicine • Dairy farming • Production of milk and dairy products • Slaughterhouse • Meat processing • Production of facility for livestock farming • Chicken yard

[12] http://www.moj.go.jp/housouken/housouken05_00055.html
[13] JETRO, http://www.jetro.go.jp/world/asia/mm/biznews/511d98117e388
[14] JETRO, http://www.jetro.go.jp/biznews/511dd8e35f758

	• Production of cattle meat • shrimp culture under fresh water and seawater • Production, sell in domestic market and export of agricultural products using imported raw materials
EIA is necessary (34 fields)	• Construction of large scale dam and irrigation facilities • Large-scale farm • Large-scale manufacturing of cotton yarn, textile and dyeing • Manufacturing of distilled alcoholic beverage and beer • Large-scale food processing factory including sugar mill • Production of leather product and rubber product • Large-scale shrimp culture and livestock breeding • Project in shallow water area • Project in vulnerable area to ecosystem's effects • Project in National park and reserved area • Project related to extinct and threatened species or animals • Project in high risk area for natural disasters • Project in recreational area or nearby pearl farm • Production of crops which need vast area • Large-scale forest plantation

Source: JETRO

In agriculture sector, restricted field for foreign investment includes those manufacturing and agricultural activities which against laws and regulations in Myanmar. Also, those fields required JV with domestic firms includes food processing which is already exist in the Union.

The fields with a certain conditionality is mostly livestock sector, and the conditionality includes Good Manufacturing Practice (GMP), Good Animal Husbandry Practice (GAHP), Hazard Analysis Critical Control Point (HACCP), and ASEAN certification standard. In addition, only JV with domestic firm has more than 40% of share is allowed to produce high value added agricultural products which use imported raw materials.

Ministry of Environmental Conservation and Forestry approves EIA, and large-scale dam construction and irrigation project, establishing large-scale agricultural farm, and Large-scale food processing factory including sugar mill needs EIA procedures, according to the Classification of Types of Economic Activities.

3) SMI Law (Small and Medium Industry Law)

As of July 2013, Ministry of Commerce is formulating Small and Medium Industry Law, which is aiming at supporting small-scale agribusiness to enhance international competitive power. According to Department of Trade promotion, 40% of SMI are small-scale agribusiness including rice mill and pulses processing, out of 40,000 SMIs in Myanmar.

2.2.8 Farmer's Association

In the rural areas in Myanmar, there exist farmer's associations in terms of land holding and supporting the specific political groups, but there is no farmer's associations such as sharing valuable information among farmers on agricultural technologies and market information. On the other hand, farmers' groups have been setup for disseminating agricultural technologies and maintaining the

terminal irrigation canals.

1) Farmer' Group in the Extension System

The Department of Agriculture (DOA) is providing the public extension services to farmers over the country. Agricultural extension organizations under the DOA are composed of state/region agricultural office, district/township agricultural offices. At each district or township office, deputy head officer is assigned as the leader of the production camp and two or more assistant managers and accountants are working under the leader. Assistant managers are responsible for extension services.

The assistant manager is also managing the production camp as the Camp leader and guiding the leader of Ten Farmer's group so called Contact Farmers or Farmer's Leader. Ten Farmer' group is trained by the Contact Farmer.

Based on the hearing from the local people, this extension system is not well managed due to the deficit of human resources as extension workers. Such similar issues are found in the livestock and fishery sectors.

2) Water Managing Groups in Irrigation Systems

There are two kinds of groups for managing irrigation water, one is organized by the government and the other is a conventional one organized by farmers themselves.

a) Water User's Group organized by the Government

In the irrigation projects in Myanmar, the government is responsible for operating and maintaining the dams / weirs to main and secondary canals. The tertiary canals and other terminal facilities so called Water Course are constructed and maintained by farmers. The Water Users' groups (WUGs) are developed in the paddy areas for each Water Course. In the Water Course, Myaung Gaung is assigned as the leader of WUGs

Water User's association (WUA) is organized at every secondary canal. One of the Myaung Gaungs becomes a representative of WUA. Roles of WUA are repairs and cleaning of canals for operation and maintenance of the canals. In case problems happened, WUA should report to the canal inspector assigned by the Irrigation Department. According to the report, current WUA's activities are not practically functioned well.[15]

Distribution of irrigation water is carried out by the other procedure. The Village Tract Chairman inform to the Water Distribution Committee under the state and regional office about the allocation of sown areas in the specific period. The Committee will inform the chairman of the irrigable areas in response to the request. After getting an approval of this procedure, the state/region office will inform the amount of irrigation water for the nominated areas. Such decision will be informed by the order from Village Tract Chairman to 100 households, then a leader of farmers

[15] "Current situations and perspectives of irrigation water management in the low land, Myanmar" 2007, Matsuno and others

b) Conventional Water Managing Group

According to WRUD under the MOAI, conventional water managing groups mean the water user's groups in the irrigated areas where they are using diesel driven pumps without any support from the government. For example, in irrigation areas by pumping in Shwebo District in Sagaing Region canals were constructed by WRUD, but all operation and maintenance works have been carried out by farmers.

On the other hand, the Water Users' Committee was setup in the pump-irrigation project implemented by the government. Under the Committee, water user's groups were organized by the government. The members of the Committee consist of WRUD, DOA, SLRD, AMD, Village-Tract Administration Officer and beneficial farmers. At present, 327 of the committees are setup as of 2013 and 200 ones are operated. The others are not able to be operated due to the high cost of diesel oil. The Water User's Committee holds the annual meeting with members after finishing the summer paddy harvest about operation and maintenance works. Most of farmers do not carry out such O&M works. The governmental agencies are executing works in place of them.

c) Water Fee

Water fee for irrigation was provided in the Myanmar Canal Act in1905. After enacting the law, many revisions were made since 1985. Water fee is laid down equally across the country at 9,000 kyat/acre (22,240 kyat/ha) for summer paddy and 6,000 kyat/acre (14,830 kyat/ha) for monsoon paddy.

However, depending upon the irrigation scheme, the following water fees are collected in some irrigation areas. 15,000 kyat/acre (37,064 kyat/ha) of water fees is collected, of which 60% is paid back to the government and the remaining 40% is used to operation and maintenance works. WRUD estimates at 65 % of the collection rate of the water fee on an average.

In case of no payment of water fee, distribution of irrigation water will not be done in the next season. Generally operation and maintenance costs should be paid by the water fee, but at present the water fee is only collected being equivalent to 23 % of the electric charges. The electric charges for pump irrigation are very high at 60,000 kyat/acre (148,260 kyat/ha), in the upper Myanmar, comparing with 7,000 to 8,000 kyat/acre (17,300 – 19,770 kyat/ha) in the lower Myanmar. This gap comes from the ground water depth such as 24 m in lower Myanmar and 60 m in upper Myanmar.[16]

As mentioned in 2.4.5 Water Tax and Embankment Tax, GOM enacted the Water Tax and Embankment Tax Law. The legible rates according to the enacted are;

- Water tax is collected from the beneficiary areas of irrigation system constructed and maintained by the State.
- Embankment tax is collected from the beneficiary areas protected from with the embankments and drainages constructed and maintained by the State.
- If any cultivated land is inclusive both irrigation system and the embankments and drainages, the tax is the same as the water tax.

[16] Hearing from WRUD, MOAI October, 2013

The collection of water tax and embankment tax according to the respective financial years 2007-2008 to 2010-2011 are given below;

Table 2-10 Collection of Water Tax and Embankment Tax

Kind of Tax	Collected Amount & Areas	2007-2008	2008-2009	2009-2010	2010-2011
Water Tax	(1) Collected Amount (million kyats)	4,395.8	4,332.2	4,118.9	4,009.5
	(2) Beneficial Area (million ha)	2.22	2.28	2.33	2.29
Case-1)	(3) Collected Area (million ha)	1.97	1.95	1.85	1.80
	(4) Collected Rate (%)	89	85	79	79
Case-2)	(5) Collected Area (million ha)	0.91	1.17	0.85	0.83
	(6) Collected Rate (%)	41	51	37	36
Embankment	(7) Collected Amount (million kyats)	12.30	12.30	12.30	12.30
Tax	(8) Collected Area (million ha)	1.00	1.00	1.00	1.00

Source: (1), (7) Outline of the Irrigation Department, October 2012, P.48 (2) Agriculture in Brief 2012, P.44

(3)= (1)/2,220kyats/ha, (5)= (1)/4,820kyats/acre, (8)=(7)/2kyats/acre

The water tax is 1,950kyats/acre (4,820kyat/ha), 1) if it is fully irrigated from land preparation to heading stage at the paddy cultivation areas and 900kyats/acre (2,220kyat/ha), 2) if it is irrigated only for land preparation (or) transplanting (or) seedling (or) reproduction (or) heading (or) partial irrigation at the paddy cultivation or any other crops. However, the collected amount in the above table is not classified depending upon the said categories. Therefore, the collected rate for each tax is estimated by the JICA survey mission being based on the following cases.

Collected rate of Water Tax

Case 1) Full irrigation 79 to 89%, Case 2) Partial irrigation 36 to 89%

If the collected areas are composed of Case 1) and 2), the rate will be 36 to 89%.

Collected rate of Embankment Tax

The collected rate is estimated at 100%, considering the following reasons.

- The embankment tax is much lower than the water tax.
- The annual collection amount is constant at 12.3 million kyats being collected from 2.46 million acre (1.00 million ha) of the whole beneficiary areas.

(9) Climate Change Mitigation and Biodiversity Conservation

In Myanmar, the Ministry of Environmental Conservation and Forestry (MOECF) is responsible for climate change mitigation and bio-diversity conservation.

1) Policies on Climate Change Mitigation

Myanmar has just prepared National Adaptation Programs of Actions –NAPA to climate change. Myanmar's NAPA specifies 32 urgent and immediate priority adaptation projects for effective climate change adaptation for eight main sectors/themes. Considering the current situations of progressive deforestation and forest degradation, Reduced Omission from Deforestation and Forest Degradation-REDD is one of the major opportunities for climate change mitigation.

Eight sector main sectors/themes: a) Agriculture, b) Early warning system, c) Forest, d) Public health, e) Water resources, f) Coastal zone, g) Energy and industry and h) Biodiversity.

About 47 % of the total country's area is still forested. Like other developing country, deforestation and forest degradation is at an alarming rate due to the socio-economic mixed factors. Major drivers of deforestation are over-exploitation, shifting cultivation, expansion of agricultural lands, urbanization, infrastructure development, fuel wood deficit and conversion of forest lands to other land use. With the own national initiative, Myanmar became a partner country of UN-REDD Program in December 2011. Since then the annual plantation program has been intensified gradually till it has reached the present target of over 40,000 ha.

2) Restoration of Degraded Forests for Climate Change Mitigation

a) Teak Plantation Establishment

A Special Teak Plantation Program was launched in 1998 in addition to the normal teak plantation scheme. The Program with 40-year rotation is structured with a series of 8 consecutive phases. Each phase, with the duration of 5 years, consists of 20 plantation centers. The harvest will be made by clear cutting at the end of the rotation of 40 years. Each centre establishes 405 ha of Teak plantation annually. The program would, therefore, have completed the establishment of teak plantation over an area of 324,000 ha at the end of the 40-year rotation.

b) Greening of the Central Dry Zone

Desert-like formation has been a threatening environmental issue facing the dry zone of the Central Myanmar. Excessive cutting of trees and clearing of natural forests for farming under the harsh climatic conditions are attributable to the occurrence of extensive desert-like formations in the country. The Dry Zone Greening Department (DZGD) was therefore formed in 1997 with special tasks to restore environment, prevent desertification and mitigate climate change in the Dry Zone of the Central Myanmar.

c) Greening Activities of the Bago Yomas Range

In order to rehabilitate the Bago Yomas range, the Forest Department has been carrying out the Bago Yomas Greening Project as a special project and the first phase is from 2004-05 to 2008-09. During the project, the major activities are being implemented as conservation and protection of natural forests, enrichment planting, natural regeneration and establishment of plantations. This project covers six divisions and the total area is 50,700.23 km^2.

d) Conservation of Mangrove Forests

Due to extensive use of the forests and encroachment for cultivation purposes, some 386,000 ha of total mangrove forests in Myanmar in the early 1990s have decreased to almost half in 2002. Depletion of mangrove forests has resulted in the loss of coastline protection, decreased crop production, and decline in fish and prawn catches among others.

The UNDP/FAO Project (MYA/96/008) implemented in the Ayeyarwady delta. The project focused, apart from the uplifting the well-being of the grass roots level communities of the region, on the rehabilitation and conservation of mangrove forests. In collaboration with JICA, a pilot project was

recently implemented and an Integrated Mangrove Management Plan has been formulated for further implementation.

e) Social Tree Planting Program

The Forest Department has launched the Nation-wide Tree Planting Program since 1997-78 with the objective of raising public awareness and greening the non-forest area in order to enhance environmental services.

f) Watershed Conservation

Restoration of watershed areas of important dams started in the early 1980s. Excessive removal of vegetative cover, practice of slash and burn system and its shortened fallow period, and overgrazing are major factors causing watershed degradation.

UNDP/FAO aided Pilot Watershed Management Project for the Kinda Dam Watershed was initiated in 1987. In response to the request by the Ministry of Agriculture and Irrigation, a special project to rehabilitate the watersheds of 53 important dams was proposed by FD. The total watershed area of the 53 critical dams is about 3.6 million ha with a planting program of 4,856 ha annually.

g) Stabilizing Shifting Cultivation

A national level multi-sector program of highlands reclamations has been developed and actions are underway. The program clearly encourages the upkeep of traditional land use system, customary rights and cultural values. In cooperation with other sectors, FD has been implementing activities as follow;

- Provision of improved technologies, complementing traditional forest-related local knowledge
- Recruiting shifting cultivators into routine forestry operations such as plantation establishment
- Provision of awareness raising campaigns and extension services

3) Conservation of Biodiversity

Conservation of biodiversity is based on Myanmar Forest Policy (1995). Policy measures gazette 30 % of the total land area f the country as reserved forest and 5 % under protected area system. Later, this target was adjusted to 10 % by 30-year National Master Plan of Ministry of Environmental Conservation and Forestry. Myanmar has 36 production areas with 37,894 km^2 representing diverse ecosystems, which cover 5.6& of the total area, and Myanmar has achieved its policy target. Eight areas that occupy 1.21% of the country total land have been proposed to be established as Production Areas (PAs) Therefore, there would be 44 PAs that cover 6.81 of the country's area and only 3.19 % of the country's area is left to achieve the target of 30-year National Forestry Master Plan.

(10) Rural Development

On April 2011, with respect of the provision of Constitution of the Republic of the Union of Myanmar of the Union of Myanmar, the Ministry of Progress of Border Areas and National Races and Development Affairs was renamed as DRD and her organization structure was compacted. Meanwhile, the main focus development activity was shifted from both urban and rural development measures to only rural development one.

In accordance with the organizational reform, a paradigm shift is also taking place. Firstly, previously practiced top-down development approach was kept far away and bottom-up approach is expected. Secondly, resource-based development strategy was left behind and human resource-based strategy is applied. In this context, the improvement of socio-economic life of rural populace is denoted as the organizational policy of DRD.

Objectives

The objectives of the establishment of Department of Rural Development are as below:

- To assist the National Rural Development and Poverty Alleviation Program;
- To improve socio-economic life of rural populace and to narrow down the development gap between urban and rural areas; and
- To preserve Myanmar's rural cultures

Tasks

In order to achieve the stated objectives, the Department of Rural Development set up 12 mains rural development tasks. These are as below;

a) Construction and maintenance of rural feeder roads and bridges connecting one village to town and inter-districts roads
b) Provision of rural safe drinking water
c) Undertaking work for rural sanitation
d) Construction of rural housing
e) undertaking rural electrification works through renewable energy sources
f) Intervention for the promotion of productive activities in rural areas
g) Creation and promotion of rural economy
h) Launching microfinance program for rural households
i) Addressing human resources development in rural areas
j) Preservation of rural cultures and traditions
k) Formulation and implementation of strategic development plans with the aims of narrow down the socio-economic gap between urban and rural areas
l) Taking appropriate measures which assist the 8-tasks National Rural Development and Poverty Alleviation Program

2.3 Current Laws and By-Laws of Agricultural Sector

2.3.1 Laws and By-Laws related to Agricultural Production

(1) Seed Law

The Seed Law is promulgated in order to implement the seed industry as economically and systematically. The Seed Law was promulgated on 7th of January, 2011 and came into force after two years, 7th of January, 2013 in order to implement the seed industry as economically and systematically. The preparation is going to establish the Seed Law Regulation.

(2) Fertilizer Law

The Fertilizer Law is promulgated in order to maintain the fertilizer industry systematically and to utilize qualified fertilizers by the farmers. Based on this Law, the following works are carried out; a) To recommend the quality of chemical fertilizers produced in domestic markets, b) To announce the quality of distributed chemical fertilizers through the field inspection, c) To supervise produced and distributed chemical fertilizers systematically.

(3) Plant Protection Law

The Plant Protection Laws consist of the Pesticide Law and the Plant Pest Quarantine Law. The Pesticide Law was promulgated in May, 1990. Objectives of this Law are to utilize correct qualified pesticides for human safety and to reduce residual effect in exported crop products and other related problems. The Plant Pest Quarantine Law was promulgated in June, 1993. Objectives of this Law are to prevent the entry of controlled pests from abroad by any means and to make effective control if entered and to keep the pest free on exported plant species and plant products and to issue the certificates on clearance of pest infestation. At present promulgation and application of this Law is accorded with international standards. Amendments and actions shall be needed in line with the age of present day if necessary.

(4) Law on Bio-Safety

Objectives of this Law are to develop bio-technology, to conduct advanced protection on long term sustainability of National Biodiversity and to assist health and safety of the people. In the past, Bio-Safety Frame Work and Law was prepared by the Ministry of Environmental Conservation and Forestry and at present, it is handed over to the Ministry of Agriculture and Irrigation. National Bio-safety Framework and bio-safety Law (3rd Draft) has been issued. However, it is needed to submit to the State Government for the approval, after amending in line with changing the administrative system.

2.3.2 Law and By-Laws related to Agricultural Land

Farmland Law and Vacant, Fallow and Virgin Land Management Law

Main objectives of Farmland Law are to obtain land use rights and opportunities on existing permitted land by the peasants from generation to generation. Main objectives of Vacant, Fallow and Virgin Land Management Law is to create job opportunities and to obtain right and permission in order to implement agriculture, livestock breeding, mining, and other legal industries permitted by the government to exploit vacant, fallow, and virgin lands for the practical development of national economy.

Both laws were promulgated on 30, March, 2012 by signing of the State President. Farmland Law was come into force on 31, August, 2012. By-Laws of both were promulgated. Central Farmland Management headed by the Minister for the Ministry of Agriculture and Irrigation was formed and assigned.

First priority is to prepare the Land Use Right Registering for individual peasant according to Farmland Law and Farmland-By Law and to issue the Land Use Right Certificate.

2.3.3 Law and By-Laws related to Agricultural Credit

Financial Institutions Law (1990) and Myanmar Agricultural Development Bank Law (1990) are legal basis of current financial institutions. National banks including Myanmar Economic Bank (MEB) and Myanmar Foreign Trade Bank (MFTB), and such private banks as Global Treasure Bank are operated based on the Financial Institutions Law (1990) and Regulation on FIs Law (1991), whereas MADB under MOAI is operated based on MADB Law (1990). At present, the Financial Institutions Law is on the process of revision. It is expected that the Board of Directors of the Central Bank of Myanmar will discuss the revised law and it will be submitted to the Parliament soon[17].

On the other hand, Microfinance Law went forth on November 30, 2011. Objectives of the law are sa follows;

a) Alleviation of rural poverty
b) Improving socio-economy, education and health condition of rural population
c) Generation of employment opportunities
d) Neutering saving behavior
e) Supporting creation of small businesses
f) Developing rural industry
g) Supporting peoples who have a will to gain income from other sector than agriculture and livestock
h) Extension of technical knowhow of both domestic and international

It is said that demand for financial service is 4 times larger than the current supply of service. Particularly, rural population which accounts for two-third of total population requires financial services seriously. Therefore, in addition to support from financial institutes, it is important to establish micro-finance network in view of commercial transaction to improve financial accessibility of small and medium scale enterprises. Also, existing micro-finance law is obviously for government intervention to micro-finance institutions, and it is necessary to adopt internationally recognized good practice to the law[18].

2.3.4 Law and By-Laws related to Export and Import of Agricultural Products

Export and Import Law went forth on September 7, 2012 at Parliament, and objective of the law is to materialize development of the country through trade based on international standards, and to perform export and import operation promptly and smoothly.

Ministry of Commerce have jurisdiction over the trade operation, and do the procedure of trade permission based on the operation rule stipulated in the By-Law, which includes a) registration of traders, b) issue of trade license, c) become a member of UMFCCI, d) perform individual procedures of export and import.

According to Mizzama News from Myanmar, dated on February 25, 2013, traders can export and

[17] "Preparatory Study for Two-Step Loan Project for Agriculture and Rural Development in Myanmar (Draft Final Report)", November 2013, JICA, Daiwa Institute of Research Ltd., and Sanyu Consultants Inc.
[18] New-Report: Microfinance in Myanmar-Sector Assessment 2013, CGAP

import without any license by April 2014. Also, Myanmar Update reported on August 6, 2013 that Myanmar government will revise the Export and Import Law and by-Law, Consumer Protection Law and other related laws and regulations.

2.3.5 Law and By-Laws related to Domestic and Foreign Investment in Agricultural Sector

Myanmar shift toward democratic country after starting U Thein Sein Regime, but to develop its economy further, Myanmar's infrastructure development is backward when we compare with other neighboring countries. For this purpose, the President revised Foreign Investment Law (1988) and enacted New Foreign Investment Law (2012) to give preferential treatment to foreign investment. The preferential treatment includes extension of tax holiday of corporate income tax from 3 year to 5 years, and extension of maximum land lease period from 60 years to 70 years. Following table shows major change of the New Foreign Investment Law.

Table 2-11 Major Change of the New Foreign Investment Law

Item	New law	Old law
Minimum Wedge	Myanmar Investment Committee make decision after approval of the government	Manufacturing: US$ 0.5 million Service: US$ 0.3 million
Controlling Share of Foreign Investment	Share of foreign investment will be decided by investors. But, for Joint Venture in prohibited and restricted field, the share will be decided based on the by-law.	Minimum: more than 35%
Land Use	50 years+ 10 years extension for two times, Applying to not only state owned land, but also private owned land	30 years+ 15 years extension for two times
Tax Holiday of Corporate Income Tax	5 years	3 rears
Employment Duty of Burmese	Unskilled labor must be Burmese. For skilled workers and engineers, following condition is applied; 2 years after establishment: 5% 4 years after establishment: 50% 6 years after establishment: 75%	non

By-law of the New Foreign Investment Law was launched within 90 days after the Law, and announced by Ministry of National Planning and Economic Development on January 31, 2013. The by-law stipulates that Myanmar Investment Committee (MIC) will announce details of the prohibited and restricted field and the field for Joint Venture with local companies, in addition to JV share of foreign companies is less than 80% in the field of prohibited and restricted investment opportunities.

For agricultural investment, Chapter 2 for business category stipulate as follows;

Article 4. (h) Cultivation and long-term and short-term agriculture which can be done by national peoples based on enforcement regulations

(i) Livestock which can be done by national peoples based on enforcement regulations

(j) Fisheries which can be done by national peoples based on enforcement regulations

However, it is criticized that the above sentences are too abstract, which result in following definition in the enforcement regulation;

Agriculture: a) agriculture which can be done with small capital, b) traditional farming

without using agricultural machineries and crop processing

Livestock: a) livestock which can be done with small capital, b) traditional farming without using modern techniques

Fisheries: a) Marine fishing, shrimp farming, and other fisheries within territorial waters of Myanmar, b) Fisheries in lake, river, and adjacent waters

Following table shows foreign direct investment in all sectors, in which investment in agriculture sector is 10th out of 12 investment sectors.

Table 2-12 Direct Investment from Foreign Countries

Order	Sector	Number	Total in million US$
1	Hydroelectric Power	6	18,874
2	Oil and Gus	109	14,063
3	Mining	66	2,826
4	Manufacturing	164	1,733
5	Hotel and Tourism	45	1,065
6	Real Estate	19	1,056
7	Livestock and Fishery	25	324
8	Transport and Communication	16	314
9	Industrial Estate	3	193
10	Agriculture	7	173
11	Construction	2	38
12	Others	6	24
Total		468	40,683

Source: Monthly Economic Indicators, March 2012

2.4 Tax System related to Agricultural Sector

2.4.1 Corporate Income Tax

- An enterprise established under the Myanmar Companies Act, an entity stabled under the Myanmar Investment Law (MFIL) and a registered branch of a foreign entity that enjoys incentive under the MFIL are subject to income tax at 25 %.
- A registered Myanmar branch of a foreign entity that does not enjoy incentive under the MFIL, and other non-resident entities are subject to income tax at the higher of 35 % or graduated rates ranging from 5 % to 40 %.

2.4.2 Commercial Tax

The tax is imposed in a wide range of goods and services procured or rendered with the country, based on the sales proceeds. The tax is also levied on the imported goods.

The commercial tax ranges from 3 % to 200 %, depending on the nature of the goods and services distributed in the schedule appended to the commercial tax law.

2.4.3 Tariff

A new notification of the Internal Revenue Department in Myanmar has just been released providing in a new 2 % income tax collection on the value of nearly all imported and exported goods. These are

the key points to note.[19]

- Importers must pay an advance income tax assessment of 2 % on the customs value of the goods for import.
- Exporters must pay an advance income tax assessment of 2 % on the all exported goods.
- These are a few exception, including import of materials and equipment during the construction period of projects with an investment permit from the Myanmar Investment Commission (MIC).
- Implemented as from 14 June 2013
- The tax collected is counted as an advance payment of the income tax payable by the importer or exporter in question, and can be reimbursed.

2.4.4 Agricultural Land Tax

In line with the VFV land law, the land tax value is: USD 8.5 per ha for perennial crops and aquaculture; USD 5.7 per ha for horticulture crops; and USD 2.8 per ha for seasonal crops and livestock.

2.4.5 Water Tax and Embankment Tax

The Pyithu Hluttaw session of 1982, under law 1, enacted the Water Tax and Embankment Tax Law. According the enactment the leviable rates are:

1) Water tax at the rate of 10 Kyats/acre (25 kyat/ha) for localities enjoying irrigable water from the government diversions and reservoirs.
2) Embankment Tax at the rate of 5 Kyats/acre (12 kyat/ha) for localities under the protection of government embankment and drainage canals, and
3) Charges of 10 Kyats/acre (25 kyat/ha) for localities enjoying both irrigation as well as flood protection facilities.

Staring from the 2007-08 financial year, the Government of the Union of Myanmar enacted the Water Tax and Embankment Tax Law. The leviable rates according to the enactment are[20]:

1) For the beneficiary areas of irrigation system constructed and maintained by the state water tax is as follow:
   - If it is fully irrigated from land preparation to heading stage at the paddy cultivation areas the water tax is 1,950 Kyats/acre (4,820 kyat/ha).
   - For any other crop except paddy, the water tax for use of irrigation water for crop cultivation is 900 Kyats/acre (2,220 kyat/ha).
   - At the paddy cultivation areas, if it is irrigated only for land preparation (or) transplanting (or) seeding (or) reproduction (or) heading (or) partial irrigation, the water tax is the same as the other crops at the rate of 900 Kyats/acre (2,220 kyat/ha).
2) For beneficiary areas protected from flood with the embankment and drainages constructed

[19] Source: Web site, VDB/LOI 2013
[20] Source: Outline of the Irrigation Department, MOAI, October 2012 p.47

and maintained by the State, the water tax is 5 Kyats/acre (12 kyat/ha).

3) If any cultivated land is inclusive both for paragraph 1) and 2), water tax is the same as in paragraph 1).

2.4.6 Tax on Fisheries

Persons engaging in all kinds of fisheries should pay tax on fisheries for getting a license. The tax rate shall be determined for each fishery by tendering.

2.5 Governmental Subsidy for Agricultural Sector

Although the supporting for farmers has not been carried out by the governmental subsidy, the government supported farmers by selling agricultural inputs with the lower prices than the market ones until 2005-06. Agricultural inputs include pesticides, fertilizers, seeds and fuels. Such supports are principally abolished at present, but high qualified seeds are distributed to farmers with the low prices, in some cases, the half of the market price.

Moreover, AMD distributed the fuels to farmers with the lower price than the market price until 1998, but no longer continue to support them. In case of irrigated areas by pumps, the subsidy for diesel oil distribution was especially implemented to summer paddy until 2010, but was abolished in 2011. WRUD has been carried out the operation and maintenance of the pumping stations by using the governmental budgets. The electric cost required for operating pumps amounts to 3 billion Kyats per annum, comparing with the collected water fee of 700 million Kyats. It means 77 % of the operation and maintenance cost is supported by a kind of the governmental subsidy.[21]

2.6 Existing Land Tenure and Constraints[22]

In March 2012, two new laws were passed by parliament, namely the Farmland Law and the Vacant, Fallow and Virgin Land Management Law, and their rules came into force in August 2012. The rigidity of land tenure under the past rules and regulations, preventing the cultivators to transfer, sell, lease or mortgage the land use rights has two major adverse impacts on agricultural productivity.

Firstly, the ability to trade the land use right means that land cannot be operated efficiently. Since transfer of land use right are difficult, if not impossible, land is allowed to be operated by farmers who lack motivation or access to complementary agricultural inputs.

Secondly, ambiguity of land tenure reduces the incentive of farmers to undertake long term investments such land leveling, soil improvements and irrigation and drainage networks.

As per the farmland law, farmland covers paddy land, dry land (ya), alluvial land (kaing), land for perennial crops, land used for rotational cultivation (dhani and taungya), garden land, land for growing of vegetables and flowers, and alluvial land. As per the VFV land law, vacant and fallow land is defined as land previously cultivated by the tenant and abandoned, and includes land cultivated by farmers and community groups under customary tenure. Virgin land is defined as ‘new land or other woodland in which cultivation has never been done.’ It includes land that has been ‘cancelled legally

[21] Hearing from DOA, MOAI, October, 2013

[22] OECD Investment Policy Review Myanmar June 2013, p-144 to p-153

from reserved forest, grazing land and fish ponds' and may or may not be covered by forest. Community forestry can be secured on such land (FSWG, 2012b). In line with the VFV land Law, VFV land can be used for agriculture, livestock and aquaculture purposes buts also mining or other government purposes.

As the issues of the new laws,

2.6.1 Complexity of land classifications

The farmland law and the VFV land law both regulate agricultural land, thereby creating uncertainty about which type of land is regulated by each of these laws. The land classification remains rigid. Thus, it does not always reflect current land use. For instance, agricultural land may be used for non-agricultural purposes only with prior government approval, and such transfers are difficult and normally only allowed for public use (ARDC, 2011). Similarly, some forest land has been partly or completely converted to agricultural use, but remains classified as forest and administered by the Forestry Department of the MECF instead of the SLRD.

2.6.2 Land Use Rights

While the government remains the ultimate owner of all land, the Constitution of 2008 has several provisions that clearly recognize and protect land use rights. It also requires the government to enact necessary laws to protect the rights of the peasants. Land us rights can be granted by different bodies on various types of land. Prior to the farmland and VFV land law if farmers cultivated land continuously and paid taxes regularly, the SDRD could grant them permanent land use rights (UPaing) after five years and hereditary rights after 10 years. Some farmers possess such permanent land use right, primarily for irrigated paddy land, while others often have less secure land use rights classified as non-permanent in tax payment documents.

The new farm land and VFV land laws provide further details on land use rights on agricultural land. Farmland and VFV land use rights can be granted to various individuals and groups. These land use rights are limited by strict conditions which increase tenure insecurity. Indeed, if land use rights holders do not respect required conditions, their land use rights may be withdrawn.

The land use rights can be now be sold, mortgaged, leased or used as collateral, but land use remains heavily regulated. As regards farmland, the relevant farmland administration body may allow cultivating other crops than paddy on paddy land, but it is supposed to conduct close scrutiny.

2.6.3 Ceiling on the Size of Landholdings and limited Time of Land Use Rights

Ceiling on the size of landholdings is as follows;

a) Up to 1991, 5 hectares for paddy, 2.5 hectares for upland and 1 hectare for alluvial land.

b) Existing ceiling is 20hectares for farmers and rural households

c) Limited time of land use rights; farmland use rights are granted as long as required conditions are not breached. In contrast, land use rights on VFV land are limited to 30 years for perennial and horticulture crops, livestock and aquaculture, and can be extended for another 30years.

2.6.4 Registering Land Use Rights

a) Registering land use rights is a long and in certain process, in particular VFV land for which application should be submitted to the CCVFV at the central level and should fulfill various conditions.

b) As for farmland, farmers need to apply for land use rights at the ward or village tract FAB

c) That submits the application to the township FAB for transmission to the district FAB. One application has been approved by the district FAB and the registration fees around US$0.57 per person has been paid, the township issues the certificate.

d) VFV land;

- Application for land above 20 hectares should be submitted to CCVFV that transmit them to the Nay Pyi Taw Council.
- Below 20 hectares, projects can be directly approved by the Nay Pyi Taw Council on region/state task force.
- Below 4 hectares, applications can be approved by the region/state government.

On the land use right on VFV land has been approved, the applicant must deposit security fees at the MADB.

- Below 20 hectares; US$8.5/ha
- Above 20 hectares; US$ 28.3/ha
- Livestock; US$ 28.3/ha

2.6.5 Land Tax System

Minimum and maximum land tax rates apply for areas within but also outside SLRD management. While the SLRD is responsible for registering and taxing agricultural land annually, it lacks the capability and resources to properly record land ownership and user rights on a cadastral map. Land cadastre is outdated in most of the country, with maps of the colonial period still being used in some areas. It needs to modernize ownership records and cadastral maps.

Land taxes; US$ 8.5/ha for perennial crops, US$5.7/ha for horticulture crops,
US$ 2.8/ha for seasonal crops and livestock

2.6.6 Obtaining Land Use Rights by Foreign Investors

Since 2012, the VFV land law has facilitated large-scale investment further. While investors can have access to farmland only through joint ventures, an investor approved by the MIC can lease VFV land on a commercial scale for activities with the permission of the CCVFV. The VFV land law limits land use rights for perennial and horticulture crops, livestock and aquaculture to 60 years. By 2012, 1.38 million ha had been granted to 267 private companies and 123 government organizations in holdings of about 1,000 to 2,000 ha.

2.6.7 Criticism over the VFV Land Law

Land grabbing and undermining land tenure security for small holders by large agribusiness

companies has been reported in recent month. Another major issue relates to the lack of monitoring of land use once it has been allocated to investors and lack of capacity to enforce the existing legislation. To respond to these concerns, the Parliament formed the Land Confiscation and Enquiry Commission to investigate the impact of these concessions on rural households. The government also established the Land Allotment and Utilization Scrutiny Committee to see the effective use of land resources. The president set a policy guideline to address landlessness and indebtedness of rural farmers. There has been recently talk about amending the farmland and VFV land laws in order to better protect the land rights of smallholders.

2.6.8 Land Administration System

While farmland is managed by the Village Tract Administrative Council (VTAC) that can allocate and withdraw land use rights on farmland, the SLRD is the main government agency responsible for surveying the cadastre, registering farmland and issuing maps classifying land use.

2.6.9 Expropriation and Compensation

When a large agricultural investor is granted agricultural land where the former had land use rights, expropriation and compensation become a major issue. The existing legislation in Myanmar does not establish the necessary safeguards for expropriation and fair compensation.

Foreign investment law of 2013 includes provisions related to expropriation and compensation but these provisions remain quite vague. Standards on Expropriation should be made solely for public purposes.

CHAPTER 3 ADMINISTRATIVE ORGANIZATIONS IN AGRICULTURE SECTOR

3.1 Governmental Organizations related to Agriculture Sector

The agriculture sector in Myanmar consists of four sub-sectors as crop, livestock, fishery and forest. However, the forest is excluded in this data collection survey of agriculture sector. The Ministry of Agriculture and Irrigation (MOAI) has a crop sub-sector of responsibility and the Ministry of Livestock, Fisheries and Rural Development (MOLFRD) has the responsibility for livestock, fisheries and rural development sub-sectors. However, the following works are carried out by the following other ministries.

3.1.1 Ministry of Agriculture and Irrigation

The Ministry of Agriculture and Irrigation (MOAI) consists of the Minister's Office (MO), the Department of Agricultural Planning (DA), Department of Agriculture (DOA), Irrigation Department (ID), Agricultural Mechanization Department (AMD), Settlement and Land Records Department (SLRD), Water Resources Utilization Department (WRUD), Myanmar Agricultural Development Bank (MADB), Department of Agricultural Research (DAR), Yezin Agricultural University (YAU) and Department of Industrial Crops Development). The organization and functions of MOAI are summarized as shown in Table 3-1.

Table 3-1 Organization and Functions of Departments under MOAI

Department	Functions
Minister's Office (MO)	Administrative task
Department of Agricultural Planning (DAP)	a) Assistance in adopting agricultural policies, b) Formulation of various agricultural plan, c) Relations with international, regional organizations and governments, d) Strengthening cooperation and coordination among inter-agencies, e) Development of agricultural trade and investment, f) Reporting and compilation of agricultural statistics, g) Conducting related surveys, h) Recommendation for further development of agriculture sector, i) Collection and dissemination of wholesale prices of agricultural commodities
Department of Agriculture (DOA)	a) Production of good quality seed varieties for main crops, culinary crops and vegetables and fruits for economy development of farmers and conducting training for farmers to produce good quality seed, b) organize training on advanced agricultural technologies and cultural prices of crops in order to facilitate for application and innovation, of these techniques by farmers, c) Conduct research on scientific cultural practices and development in order to produce good quality and high yielding seeds.
Irrigation Department (ID)	a) Design formulation for new irrigation projects based upon hydrological and geological investigations and topographic survey data, b) Planning and implementation of new irrigation projects, c) Operation and maintenance of existing irrigation and drainage systems, flood protection embankments and polders, d) Seasonal and temporary measures for summer paddy cultivation, e) Technical assistance to village embankment and village irrigation works for rural development, f) Installation of micro-hydro power generation plants along the irrigation canals, g) Providing the on-farm water management development training for farmers' Water User Association, h) Conducting the training for capacity building of irrigation for capacity building of irrigation staff to enhance the irrigation technologies

Department	Functions
Agricultural Mechanization Department (AMD)	a) Land reclamation, land consolidation and land development works, b) Provision of farm mechanization services on land preparation, harvesting and threshing, c) Production and distribution of appropriate farm machinery, d) Research and development on utilization of agricultural machinery, e) Implementation of up-land reclamation in hilly regions, f) Dissemination of technical know-how on utilization of farm machinery to local farmers and production technologies to private industries
Settlement and Land Records Department (SLRD)	a) Updating land maps and registers, b) Land surveys and map productions, c) Collection compilation and issuing timely and reliable crop statistics, d) Collection and compilation of land use statistics, e) Land administration and decision on agricultural land disputes, f) Conducting agricultural socio-economic surveys
Water Resources Utilization Department (WRUD)	a) To supply irrigation water by pumping water from river and streams and also utilization of underground water from feasible potential for boosting crop production, b) To promote socio-economic conditions of rural population by supply safe drinking water from both tube wells and piped water supply reticulation systems, c) Supply crop water as well as drinking water from spring sources by gravity flow systems in the mountainous region of the border and remote areas, and to examine water quality for drinking and irrigation purposes applying high technology, water analysis methods, d) To disseminate the knowledge and practice of efficient usage of drip irrigation, e) To apply renewable energy, being installed Biomass Gasifire in river water pumping facilities
Myanmar Agricultural Development Bank (MADB)	a) Lending seasonal, short, medium and long loans to farmers, b) Collecting repayment of bank loans, c) Encouraging farmers to open deposit and saving accounts at MADB
Department of Agricultural Research (DAR)	a) Research development on high yielding crop various, b) Generation of agricultural maximization of befits and sustainable use of natural resources and conservation and utilization of crop genetic resources, c) Dissemination of improved crop varieties and agronomic technologies to farmers, d) Development of human resources in agricultural research
Yezin Agricultural University (YAU)	a) To produce highly qualified agriculturalists needed for development of the agriculture sector, b) To provide adequate technical training on modern methods of agriculture, c) To provide practical training to students who wish to engage in scientific farming through co-operatives or private enterprises
Department of Industrial Crop Development (DICD)	a) To produce high-yield and qualified seeds for industrial crops such as sugarcane, cotton, jute, rubber, coffee and other industrial crops for increased production, b) To educate industrial crop farmers with advanced agricultural techniques, c) To develop scientific agricultural practices through R&D for production of seeds for industrial crops with specific characteristics of resistance to pest, diseases and serious weather

Source: Myanmar Agriculture in Brief 2012

Note: Survey Department is excluded due to transfer to other Ministry

3.1.2 Ministry of Livestock, Fisheries and Rural Development

The Ministry of Livestock, Fisheries and Rural Development (MOLFRD) consists of Directorate of Livestock and Fisheries (DLF), Livestock Breeding and Veterinary Department (LBVD), Department of Fisheries (DOF), Department of Rural Development (DRD), University of Veterinary Science (UVS). The DRD under the Ministry of Border Affairs was transferred to the MOLF in September,

2013. Under the DRD, Offices of State/Region and State Branches (16 offices), Offices of Township (283 offices), and National Race Village (1 office) have been set up. The Organization and functions of MOLFRD are summarized as shown in Table 3-2.

Table 3-2 Organization and Functions of Departments under MOLVFRD

Department	Functions
Directorate of Livestock and Fisheries (DLF)	a) Assistance in adopting livestock, fisheries and rural development policies, b) Formulation of various plans and projects, c) Conducting relations with international organizations, d) To coordinate, supervise, monitor, and evaluate the performance of the livestock, fisheries and rural development sector
Livestock Breeding and Veterinary Department (LBVD)	a) To take responsibility to develop the whole national livestock sector, b)To collect and analysis the data of animal breeding and production, c) To conduct production of animal drugs/vaccines and activities of treatment and prevention, d) Encouraging of pasture development, e) Undertaking of the Artificial Insemination in livestock development, f) Conducting of training, research and laboratory works in order to develop livestock breeding, g) Establishing of livestock breeding zones for the development of livestock breeding in private sector, h) To encourage the activities of livestock and fishery sector in rural development and poverty alleviation, i) Issuance of certificate on exportation and importation of animal and animal products, undertaking the activity of Animal Quarantine Stations and animal check points, j) To extend livestock activities, within the State/Region according to the Livestock Development Bank system, k) Encourage of livestock production by substitution in the place of poppy plantation, l) To undertake the scientific livestock production by establishing integrated livestock farms
Department of Fisheries (DOF)	a) Conservation and rehabilitation of fisheries resources, b) Promotion of fisheries researches and surveys, c) Collection and compilation of fishery statistics and information, d) Extension services, e) Supervision of fishery sector, f) Sustainability of fishery resources
Department of Rural Development (DRD)	a) Construction and maintenance of rural feeder roads and bridges connecting one village to town and inter-districts roads, b) Provision of rural safe drinking water, c) Undertaking work for rural sanitation, d) Construction of rural housing, e) Undertaking rural electrification works through renewable energy sources, f) Intervention for the promotion of productive activities in rural areas, g) Creation and promotion of rural economy, h) Launching microfinance program for rural households, i) Addressing human resources development in rural areas, j) Preservation of rural cultures and traditions, k) Formulation and implementation of strategic development plans with the aims of narrow down the socio-economic gap between urban rural areas, l) Taking appropriate measures which assist the 8-tasks National Rural Development and Poverty Alleviation Program
University of Veterinary Science (UVS)	To offer a five-year bachelor science program and also offer graduate degree programs (PhD, Mphil, MSc, MVSc) as the only university of veterinary science in Myanmar, b) To work with the international universities and institutions

Source: All data are based on the hearing from the MOLVFRD, October, 2013.

3.1.3 Organization and Functions of other Ministries related to Agriculture Sector

The following works related to the agriculture sector are carried out by the following ministries.

(1) Climate Change and Bio-Diversification: Department of Forest (DF), Ministry of Environmental Conservation and Forestry (MOECF)

The Department of Forest under the Ministry of Environmental Conservation and Forestry is in charge of climate change mitigation and bio-diversity conservation. The MOECF is a coordinating body as Myanmar National Adaptation Program of Action (NAPA) has set up environmental committee and working for climate change mitigation. As for bio-diversity conservation, the DF is conserving and securing the reserved forest based on Myanmar Forest Policy (1995).

(2) Export and import of Agricultural Products and Post Harvest Facilities: Department of Trade Promotion (DTP), Ministry of Commerce(MOC)

The Department of Trade Promotion, Ministry of Commerce has duties for national export strategy, export and import tax for agro- products, deregulation of farm produce trade, financial support for enhancing export, strengthening of export-competition power and management of post harvest products, facilities and marketing.

(3) Food Inspection: Department of Food and Drug Administration (FDA), Ministry of Health (MOH)

The Department of Food and Drug Administration, Ministry of Health is responsible for issuing health recommendation and certification for local food manufacturing, import and export commodities in the process of production, storage, distribution and market based on the National Food Law, 1997.

(4) Agricultural Producer' Cooperative Societies: Cooperative Department, Ministry of Cooperative

The Cooperative Department is responsible for such functions as regulatory, organization, education, and supervision to improve the cooperative movement and will assist in the formation and development of cooperative societies.

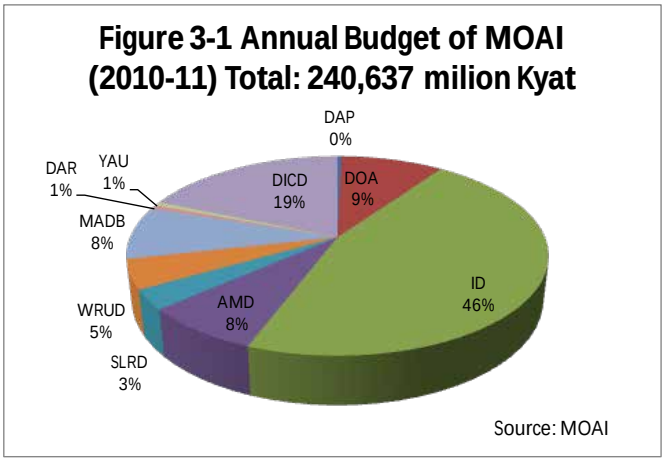
3.2 Governmental Budget Allocation to MOAI and MOLFRD

The governmental budget allocation to the agriculture sector is given mainly to the MOAI and MOLFRD. Data on the budget allocation to ten related departments and other organizations of MOAI excluding Minister’s Office (MO) and Survey Department were obtained from the MOAI. Data on the budget allocation to the RDD of MOLFRD was not obtained because of the newly transferred from the Ministry of Border Affairs in September, 2013.

3.2.1 Ministry of Agriculture and Irrigation (MOAI)

Total budget of MOAI in 2010-11 was 241 billion kyat, out of which, administrative (current) cost accounts for 65% (158 billion kyat) and rests were project cost (83 billion kyat) which makes up 35% of total annual budget of MOAI. When we look at each department’s budget, largest budget consumer was Irrigation Department (ID), which uses 46% of total budget, followed by Department of Industrial Crop Development (19%), Department of Agriculture (9%), Agricultural Mechanization Department

and Myanmar Agriculture Development Bank (8%), and Water Resources Utilization Department (5%).



On one hand, as for three years total (2008-09 to 2010-11), ID consumes 90% of MOAI's project budget, and next is WRUD which implements pump irrigation project using ground water. In total, ID and WRUD use 97% of MOAI's project budget. On the other hand, DICD use 22% of administrative cost, followed by ID (20%), AMD (12%), and MADB (9%). Following table shows annual budget of MOAI from 2008-09 to 2010-11.

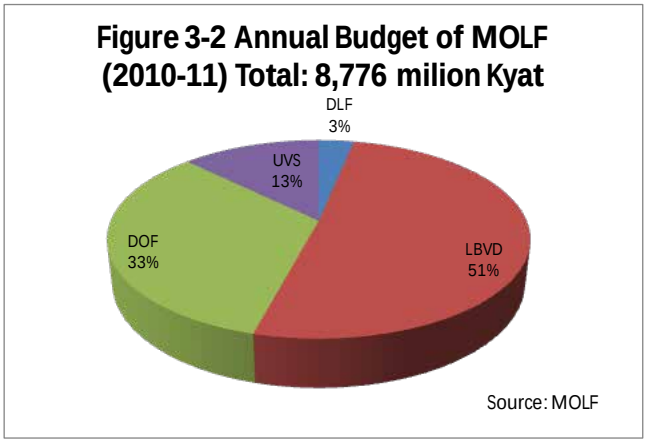
Table 3-3 Budget Allocation to Departments (Million kyat)

Name	2008/09			2009/10			20010/11			Grand Total			Rate %
	CUR	CAP	Total	CUR	CAP	Total	CUR	CAP	Total	CUR	CAP	Total	
DAP	639	84	723	674	70	744	800	52	852	2,113	206	2,319	0.3
DOA	1,582	752	2,334	17,380	1,375	18,755	20,679	1,942	22,621	39,641	4,069	43,710	6.2
ID	27,187	126,043	153,230	32,635	88,314	120,949	37,122	73,698	110,820	96,944	288,055	384,999	54.4
AMD	23,346	467	23,813	16,933	358	17,291	18,307	368	18,675	58.586	1,193	59,779	8.4
SLRD	5,018	73	5,091	5,701	169	5,870	7,599	62	7,661	18,318	304	18,622	2.6
WRUD	5,899	7,261	15,160	6,243	7,927	14,170	6,598	4,905	11,503	18,740	22,093	40,833	5.7
MAD	9,494	52	9,546	11,490	72	11,562	20,596	49	20,645	41580	173	41,753	5.9
DAR	1,203	31	1,234	1,280	19	1,299	1,499	25	1,524	3,982	75	4,057	0.7
YAU	430	1,020	1,450	558	780	1,338	659	818	1,477	1,647	2,618	4,265	0.7
DICD	29,188	1,688	30,876	29,821	1,105	30,926	44,096	763	44,859	103,105	3,556	106,661	15.1
Total	105,986	137,471	243,457	122,715	100,189	222,904	157,955	82,682	240,637	384,656	322,342	706,998	100

Data source: Budge is based on hearing from MOAI. Minister's Office (MO) and Survey Department (shift to other ministry) is excluded. CUR stands for Current, CAP for Capital

3.2.2 Ministry of Livestock, Fisheries and Rural Development (MOLFRD)

Annual budget of Ministry of Livestock, Fisheries, and Rural Development was 8.8 billion kyat in 2010-11, which consist of 68% of administrative (current) cost and 32% of project cost. As for annual budget of each department, Livestock Breeding and Veterinary Department (LBVD) make up 51% of total MOLFRD's budget, followed by Department of Fisheries (DOF) for 33%, University of Veterinary Science (UVS) for 12%, and Directorate of Livestock and Fisheries (DLF) for 3%.



As for three years total (2008-09 to 2010-11), LBVD uses 54% of total project budget of the Ministry, and followed by UVS (8%) and DLF (3%). DLF is a management body of the Ministry, and seldom to use project cost, result in 90% of budget of the Directorate being administrative cost. Following table shows annual budget of MOLFRD from 2008-09 to 2010-11.

Table 3-4 Budget Allocation to Department（Million kyats）

Name	2008/09			2009/10			20010/11			Grand Total			Rate %
	CUR	CAP	total	CUR	CAP	Total	CUR	CAP	Total	CUR	CAP	Total	
DLF	187	5	192	205	27	232	243	41	284	635	73	708	3.3
LBVD	2,203	812	3,015	2,474	1,599	4、073	3,050	1,418	4,468	7,727	3,829	11,556	53.7
DOF	1,678	384	2,062	1,832	711	2,543	2.369	544	2,912	5,878	1,639	7,517	35.0
UVS	210	135	345	217	50	267	275	837	1,112	702	1,022	1,724	8.0
Total	4,278	1,336	5,614	4,728	2,387	7,115	5,936	2,840	8,776	14,942	6,563	21,505	100.0

Data source: Budget is based on hearing from MOLFRD. CUR stands for 'Current', CAP for 'Capital'
Budget for Department of Rural Development is not shown in the above table due to recent transferring to the MOLFRD from MOBA in September 2013

3.3 The Process of Decision-Making for Policies and Budget in Central and State/Regional Government

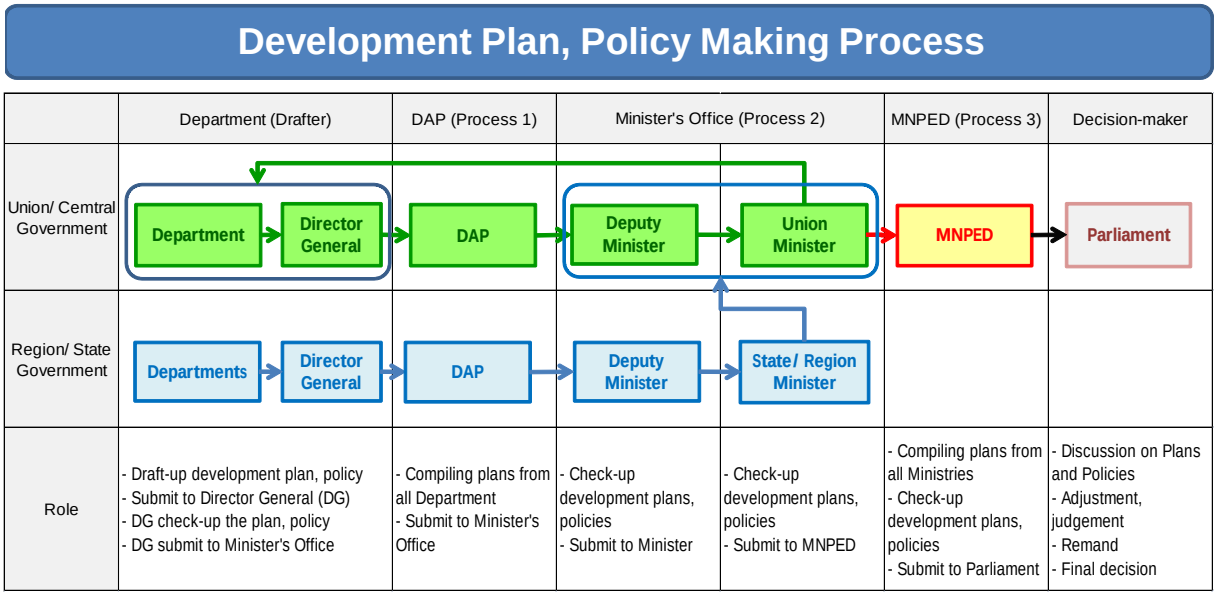
3.3.1 Development Plan

Based on the Minister's direction, each Department draft-up development plan at first, and Director General submit the draft to Department of Agricultural Planning (DAP), which compile each draft development plan submitted by departments in MOAI. Then, DAP submit the compiled development plan to Minister's Office where Vice Ministers check the Ministry's Development Plan and submit to Minister for final check. The Minister submits the plan to Ministry of National Planning and Economic Development (MNPED) which compile all ministries development plan into Draft National Comprehensive Development Plan. MNPED finally submit it to parliament for final approval.

As for Region and State level planning process, development plan is draft-up at each department at first, then is submitted to each Minister's Office at Regional and State Government where the draft plan is compiled to Regional Agriculture Plan for example. Then, Region/State Minister of Agriculture submit their regional plan to Union Minister of Agriculture and Irrigation. The Union Minister check the plan and instruct to DAP with his comments.

According to DOA officials, Fifth Five Year Development Plan was once submitted to parliament, but is not yet approved since the parliament asked each ministry to revise the development plan.

Table 3-5 Decision Making Process in MOAI



3.3.2 Budget

Decision making process of budget is basically same as above, but Union Minister submits the budget plan to Ministry of Finance. The draft budget plan is formulated at department level at first, and DAP compile the plan as the Ministry's budget plan. Then DAP submit the draft plan to Minister's Office for approval by Vice Minister and Union Minister. The budget plan of MOAI is submitted to Ministry of Finance, which in turn submit to the Parliament for discussion and final approval.

According to Planning Division of DOA, each department in MOAI draft-up the budget plan during June and July, and DAP compiles them from July to August. At Minister's Office the plan is checked during August and September, and Ministry of Finance compiles the national level budget plan from September to October, and the Parliament discusses it during October and November. On the other hand, regional governments draft-up their budget plan during June to July, and submit it to Union Ministers.

From 2014-15 accounting year, it is said that the government allocate more budget to region and state. According to MOAI, budget planning process is not usual this year and Union Ministry formulate all administrative budget including regional and state level cost, but regional and state government formulate budget plan for construction work. Also, the line Ministries will enhance regional and state level government by sending officials from the central so that regional government can make decision on their development plan. The decision making process is changing and it is necessary to keep watching.

CHAPTER 4 OUTLINE OF CURRENT AGRICULTURAL ACTIVITIES

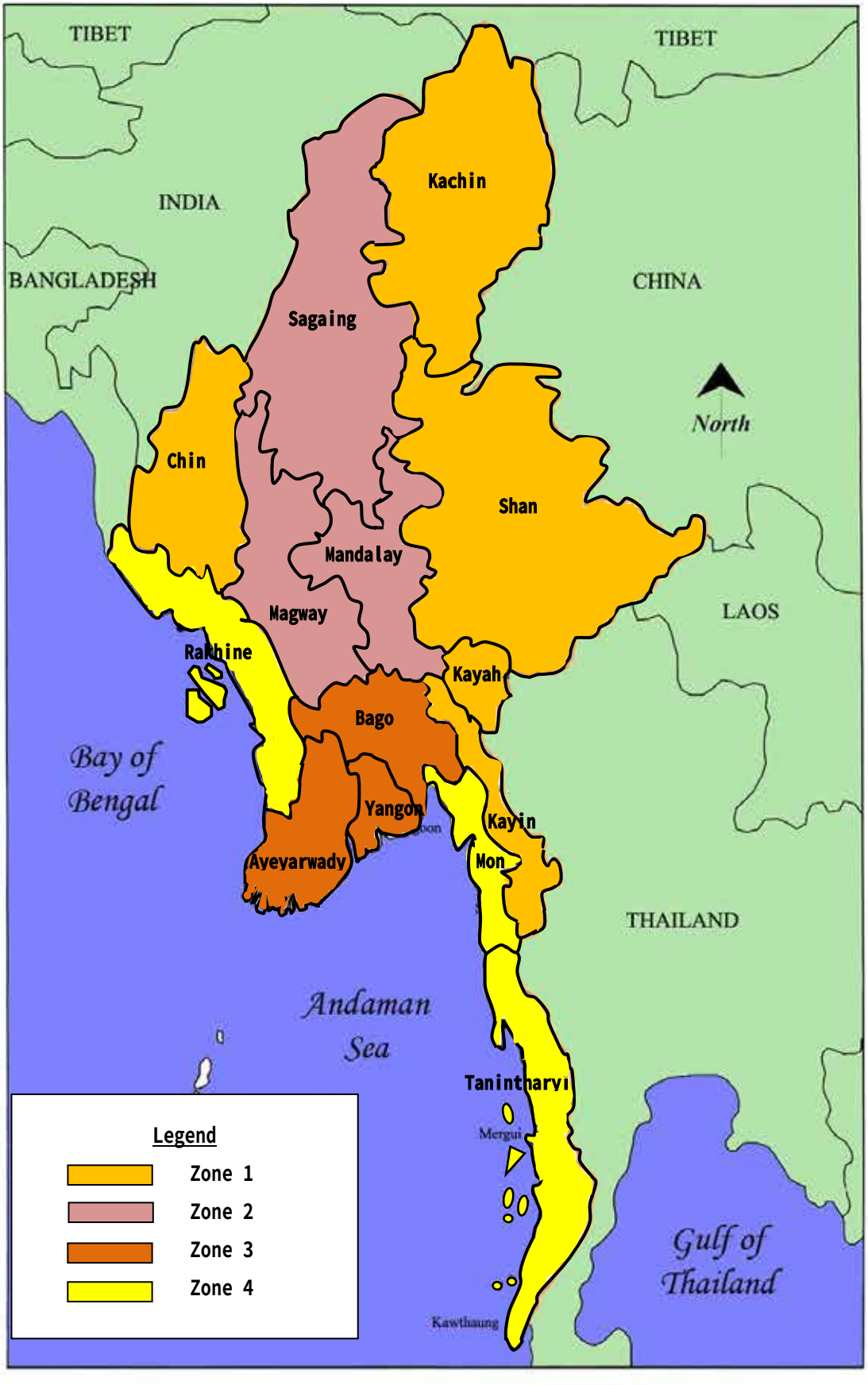
4.1 Agricultural Zoning and Characteristics

Agriculture zoning of Myanmar is made to divide the whole of the national land into four zones、taking into consideration ecological environment of agriculture formed by topography, land use, climate, sown crops and administrative state/region. Agricultural characteristics of each zone are summarized as shown in Table 4-1 and Figure 4-1.

Table 4-1 Agricultural Zoning and Characteristics

Item	Zone I Hilly and Mountainous Area	Zone II Central Dry Zone Area	Zone III Delta Area	Zone IV Costal Area
Administrative Area	Kachin State Kayah State Chin State Shan State	Sagaing Region Magway Region Mandalay Region	Ayeyarwady Region Yangon Region Bago Regio	Mon State Tanintharyi Region Rakhine State
Climate	ž Rainy season (Mid-May to Mid-Oct.) ž Dry season (Mid-Oct.to Mid-May) ž Annual Rainfall (1,000 to 2,000mm)	ž Summer (Mar. to May ž Rainy season (Mid-May to Oct.), ž Winter (Nov. to Feb.) ž Annual rainfall (700 to 1,000mm)	ž Rainy season (Mid-May to Mid-Oct.) ž Dry season (Mid-Oct. to Mid-May) ž Annual rainfall (2,200 to 28,000mm)	ž annual rainfall (3,000 - 5,000mm)
Topography and Land Use	ž High mountains, range and forests ž Some areas high rainfall, rivers developed ž Crop cultivation in valley areas, shift-cultivation in hilly areas	ž Flat topography, semi-dry to dry condition ž Paddy cultivation by irrigation water. Rain-fed paddy lands are found in some areas.	ž low land consists of Ayeyarwady delta and Sittaung delta ž Area 3.1 million ha, paddy monoculture	ž Cultivated areas of coastal regions of Mon,Tanintharyi, Rakhine
Major Crops and Potential	ž Rice wheat, maize, sorghum vegetables, sugarcane ž Soil types and topography is suitable for agro-forestry.	ž Rice, groundnut, sesame, pulses, oil seeds etc., various crops are sown.	ž Rice, pulses ž 60% of total rice production is produced in this zone.	ž Rice, rubber, oil palm oil ž Rice sufficiency area ž Potential area for development rubber, coconut and oil palm
Issues for Agricultural Production	ž Forest land is degraded by shifting cultivation. Soil erosion, sediment and deficit of water resources are found. ž Few fertile land and low potential to manage the large scale farming	ž To increase crop production depend upon the improving existing irrigation networks and maintenance canals ž Production of sesame depends on weather condition. ž Rice deficit is observed in some areas.	ž This zone cannot be classified as problematic one for agricultural production, but more renovation on flooding and drainage protection becomes necessary.	ž Flood protection and drainage improvement are required.

Figure 4-1 Agricultural Zoning



4.2 Outline of Major Crops-Production

From a view point of needs for domestic consumption and foreign currency earning, ten crops are selected as major crops for Myanmar. Current situations of major crops-production are shown as the following tables.

Table 4-2 (1) Comparison between Current Yield and Target Yield for Major Crops

	Name of crops	Current Yield (MT/ha)	Target Yield (MT/ha)	Target Yield (MT/ha)
1	Paddy	3.78	5.16	-1.38
2	Sugarcane	62.03	75.32	-13.29
3	Long Stap Long Stable Cotton	1.63	1.61	＋0.02
4	Maize	3.61	4.93	-1.32
5	Groundnut	1,58	1.40	+0.18
6	Sesame	0.55	1.21	-0.66
7	Sunflower	1.59	1.79	-0.20
8	Black gram	1.26	1.61	-0.35
9	Green gram	1.22	1.61	-0.39
10	Pigeon pea	1.32	2.02	-0.70

Source : Current Yield, SLRD （2011/12. Target Yield, Myanmar Agriculture in Brief 2012 MT: Metric Ton

Table4-2 (2) Production, Source and Market of Major Crops

No.	Name of crops	Production (2009/10) MMT	Source	Domestic Market	Foreign Market	
					Export (MMT)	Countries for Export
1	Paddy	32.17	Ayeyarwady, Bago,Sagaing	Any place	0.82	South Africa, Singapore, Philippine
2	Sugarcane	9.56	Sagaing,Shan,Bago	-do-	-	-
3	Long Staple Cotton	0.48	Marway,Mandalay,Sagaing	-do-	-	-
4	Maize	1.23	Sgan,Sagaing,Magway	-do-	0.12	Malaysia, Indonesia, Hong Kong
5	Ground nut	1.34	Sagaing,Magway,Mandalay	-do-	-	-
6	Sesame	0.85	Magway,Sagaing,Mandalay	-do-	-	-
7	Sunflower	0.77	Ayeyarwady,Magway,Sagaing	-do-	-	-
8	Black gram	1.49	Ayeyarwady,Bago, Sagaing	-do-	0.62	India, Singapore, Malaysia,
9	Green gram	1.32	Magway,Sagaing,Bago	-do-	0.30	India, Malaysia, Singapore
10	Pigeon pea	0.76	Sagaing,Magway,Mandalay	-do-	0.19	India, Belgium, Indonesia

Source: Myanmar Agricultural Statistics, 2011 MMT (million Metric Ton)

Table 4-2 (3) Annual Production of Major Crops (Million Ton)

No.	Name of Crops	2005/06	2006/07	2007/08	2008/09	2009/10
1	Paddy	27.25	30.44	30.95	32.06	32.17
2	Sugarcane	7.07	8.04	9.68	9.74	9.56
3	Long Staple Cotton	0.20	0.23	0.27	0.41	0.48
4	Maize	0.90	1.02	1.13	1.19	1.22
5	Ground nut	1.02	1.09	1.20	1.28	1.34
6	Sesame	0.50	0.68	0.77	0.84	0.85
7	Sunflower	0.55	0.49	0.69	0.77	0.77
8	Black gram	1.01	1.18	1.35	1.42	1.49
9	Green gram	0.93	1.04	1.18	1.22	1.32
10	Pigeon pea	0.60	0.65	0.72	0.77	0.76

Source：Myanmar Agricultural Statistics, 2011

The most important factors of production to achieve the target yield are the efficient utilization of the fertilizers and improved varieties. With the limited credit and low investment to the farmers, utilization of fertilizer in even major crops is minimal amount far below the recommended dose. It is considerable that the yields of these pillar crops are increasing trend over years while utilization of fertilizers was low with minimal dose. However, the productivities of crops are dwindling along uptrend.[23]

Research and development activities on crop varieties improvement are substantially in progress. Since the farmers normally convince the importance of improved seed to increase the productivity of the crops, the improved seeds are disseminated to the farmers through extension agencies and also farmers to farmers. In order to achieve the target yield, investment for fertilizers, sufficient irrigation water and development of seed program are the factors for increased productivity, which are urgent needs of the farmers.[24]

In order to achieve the target yield of major crops, the MOAI is are taking the following measures; [25]

a) Application of improved varieties which are suitable for respective states and regions
b) Utilization of adequate fertilizers
c) Effective pest management
d) Application of efficient and appropriates technologies
e) Utilization of appropriate cropping pattern suitable for the respective location

4.3 Land Utilization

The land utilization in Myanmar can be seen as shown in Table 4-3(1).

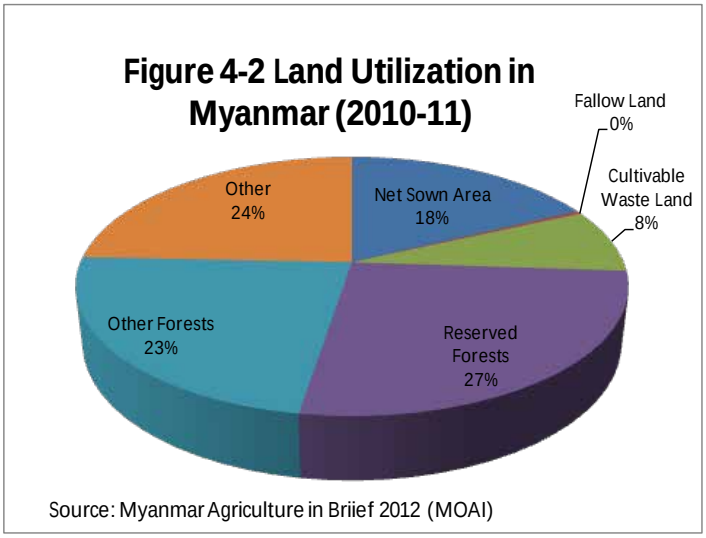
[23] Agriculture Development Issues and Strategies, Myanmar January, Tin Maung Shwe, 2011
[24] Agriculture Development Issues and Strategies, Myanmar January, Tin Maung Shwe, 2011
[25] Myanmar Agriculture in Brief, 2012

Table 4-3 Land Utilization of Myanmar

Year	Land Utilization (million ha)						
	Sown Area	Fallow	Cultivable Waste Land	Reserved Forest	Other Forest	Others	Total
1997-1998	8.97	1.18	7.85	10.47	21,99	17.18	67.64
1998-1999	9.31	0.99	7.55	11.62	20.96	17.21	67.64
1999-2000	9.67	0.77	7.31	12.5	20.26	17.13	67.64
2000-2001	9.91	0.69	7.2	12.91	19.78	17.14	67.64
2001-2002	9.99	0.62	6.66	13.97	19.32	17.08	67.64
2002-2003	10.08	0.58	6.52	14.17	19.23	17.04	67.64
2003-2004	10.25	0.52	6.57	15.13	18.31	17.86	67.64
2004-2005	10.51	0.44	6.41	15.38	18.13	16.77	67.64
2005-2006	10.92	0.37	6.28	15.71	17.82	16.54	67.64
2006-2007	11.38	0.31	5.97	16.46	16.98	16.54	67.64
2007-2008	11.01	0.26	5.78	16.75	16.54	16.6	67.64
2008-2009	11.88	0.26	5.67	16.83	16.41	16.59	67.64
2009-2010	11.87	0.23	5.61	16.89	16.25	16.68	67.64
2010-2011	12.02	0.23	5.41	17.91	15.13	16.94	67.64

Source: Data from 1997-98 to 2009-10 are obtained from Myamanar Agricutural Statistics, 2011 , data on 2010-11 is from Myanmar Agriculture in Brief 2012による。

As land resources, Myanmar possesses 17.66 million hectares of cultivable land including net sown area, fallow land and cultivable waste land, which is 18 % of the national land, 67.64 million hectares. Presently, there are 12.02 million hectares of net sown area in the country. For expansion of new agricultural land, remaining 0.23 million hectares of fallow land and 5.40 million hectares of cultivable waste land, can be developed. Most of agricultural land, which is about 8.15 million hectares, is currently cultivated by small-scale farmers.



The land holding size by agricultural zone is shown in Table 4-3 (2) according to the LIFT survey on a sample of 4,000 households. Land holding size varies considerably across regions. In 2012, 26% of households in the hilly zone did not own land, and 72% in the delta/coastal zone. Among households owning land, the size of land holdings varied widely. In the delta/coastal zone, 26% of these households owned 2 ha or less, while in all other regions, most of them held less than 2 ha. Similarly, the average size of land holdings in the delta/coastal zone was much larger than in any other area at 6.7 ha against 1.4 ha in the hilly zone and 2.5 ha in the dry zone.

Table 4-3 (2) Land Holding Size by Region, (%)

	Hilly	Dry	Delta/Coastal	Total
no land	26.1	42.6	72.1	49.9
≤ 0.4ha	3.9	2.5	0.9	2.2
< 0.4 to 0.8 ha	36	12.8	1.4	15.8
< 0.8 to 2 ha	23.1	21.6	5.1	16.3
< 2 to 4 ha	8.5	12.4	8.6	9.4
<4 to 6 ha	1.2	3.8	3.9	2.5
< 6 to 8 ha	0.6	2.8	3.1	2.0
> 8 ha	0.5	1.6	4.9	1.9
Total number of persons	**800**	**800**	**800**	**4,000**

Source: LIFT, 2012 Total number of persons means the number of interviewed persons in surveying.

At present, the Myanmar Government is promoting the following development of agricultural land:

a) Reclamation of fallow and cultivable waste land
b) Development of farmers embankment and paddy-fish integrated farming in deep water areas
c) Protection of soil erosion and development of terrace farming in high-land areas

Land improvement is also being undertaken in the existing agricultural land through proper drainage, irrigation and farm roads. Apart from the traditional small-scale crop cultivation, development of modernized large scale agricultural farming by the private sector is being encouraged.

4.3.1 Development of Virgin, Fallow Land and Cultivable Waste Land

National companies and associations in private sector are encouraged and granted to develop virgin land and fallow lands for the cultivation of paddy, pulses, oil crops, industrial crops, rubber, oil palm, and other crops. At present, 267 private companies and 123 government-owned organizations have been granted 1,38million hectares for commercial farming.

4.3.2 Modern Upland Reclamation (Replacing Slash and Burn Farming)

Apart from the above scheme, modern upland farm reclamation project is being undertaken to meet the following objectives,

a) Replacing slash and burn method with terrace farming
b) Enabling the people in hilly regions to live in permanent settlements
c) Eliminating cultivation of opium poppy through terrace farming to improve the living standard of the people in hilly regions
d) Preserving and protecting natural environment

4.4 Food Balance

4.4.1 Rice

As official recorded data in 2009-2010, rice harvested area reached to 8.1 million hectares and its production increased to 32.68 million tons, which is equivalent to 19.61 million tons of milled rice. The country as a whole is in surplus of rice and self-sufficiency rate is estimated to be about 168 %. However as seen in Table 4-4, Mandalay Region, Magway Region and Chin State out of 14 states and

regions are recorded as rice deficit areas, accounting self-sufficiency rate is estimated to be about 66, 98 and 69 % respectively.

Table 4-4 Self-sufficiency Rate of Rice (Husked) in 2009-10

(thousand ton)

No.	State and Region	Total Production	Utilization				Deficit/ Surplus	Sufficiecy Rate(%)
			Seeds	Waste	Consumption	Total		
1	Kachin State	985	28	42	460	531	455	185
2	Kayah State	156	5	7	103	114	42	137
3	Kayin	951	28	42	544	614	337	155
4	Chin State	122	6	9	163	178	**-56**	**69**
5	Sagaing Region	4,069	95	142	1,952	2,189	1,880	186
6	Tanintharyi Region	576	17	25	497	539	37	107
7	Bago Region	5,671	147	220	1,768	2,135	3,536	266
8	Magway Region	1,757	43	64	1,676	1,782	**-25**	**98**
9	Mandalay Region	1,670	38	58	2,432	2,528	**-858**	**66**
10	Mon State	1,525	42	64	904	1,010	514	151
11	Rakhine	1,886	52	77	983	1,112	773	170
12	Yangon Region	2,075	58	87	1,836	1,982	93	105
13	Shan State	2,596	65	97	1,658	2,917	776	89
14	Ayeyarwady Region	8,643	209	313	2,395	2,917	5,726	296
	Total	32,682	833	1,247	17,371	19,451	13,230	168

Data source: Myanmar Agricultural Statistics, 2011

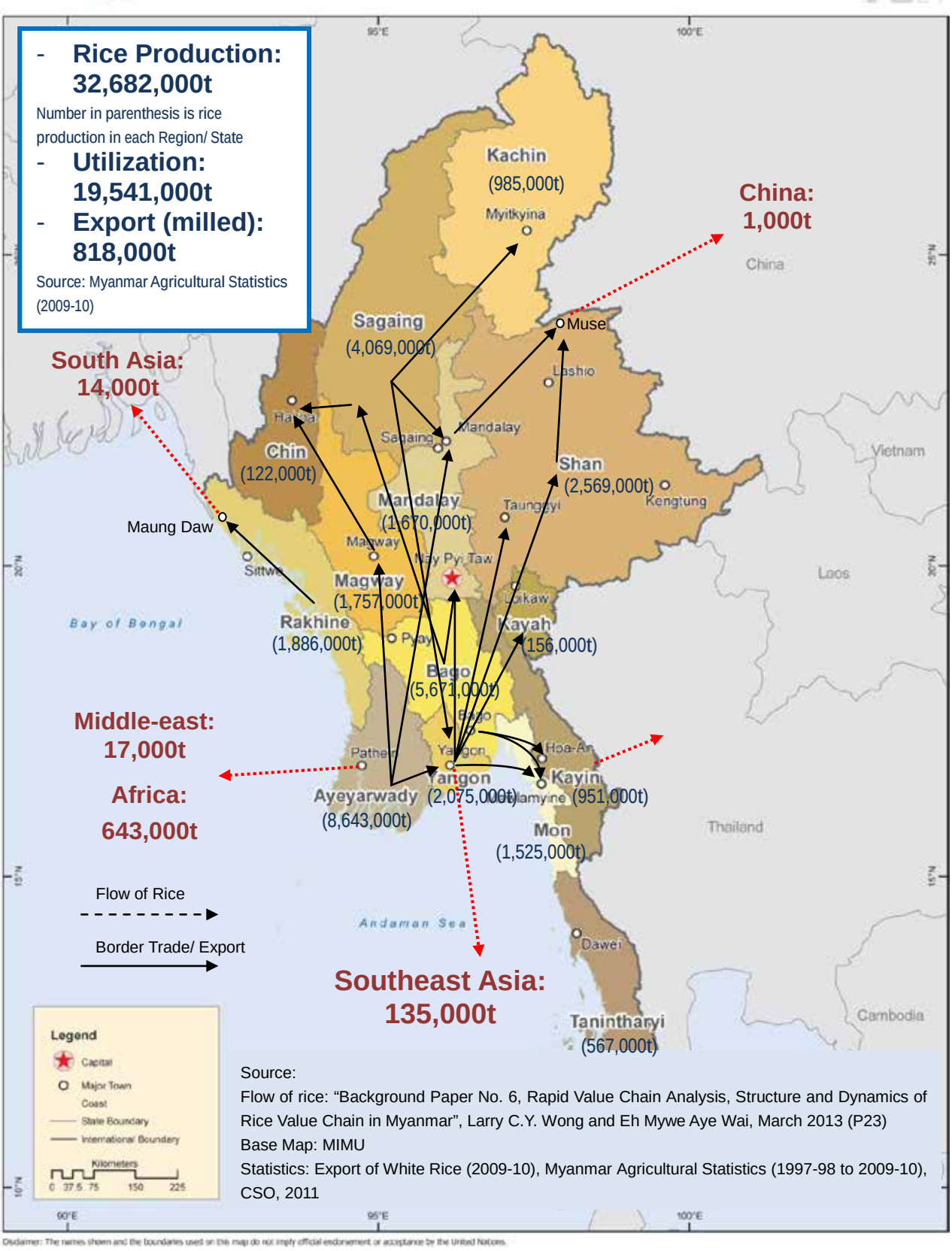
Myanmar is known to be one of the highest rice consuming countries at the average of 196 kg/head/annum in husked rice. After deducting consumption, seeds and waste, it has a surplus of 13 million tons (8 million tons in milled rice). However, total export of rice reached only 0.67 million tons in 2008. The big difference between surplus of milled rice and amount of export rice has the questions such reliability of the production data, consumption rate, population, estimation of the milling recovery, quality of the grain and illegal outlet across the border and sea coasts. In addition, export volume of rice was also fluctuating over years. It is indicated that demand for Myanmar rice is unstable in global rice trade.

Table 4-5 Comparison between Rice Production (husked) and Export Rice (milled)

Year	Production（Million tons）	Export Rice（Thousand tons）
2004/05	24.75	182.20
2005/06	27.88	180.00
2006/07	30.92	15.00
2007/08	31.45	358.00
2008/09	32.57	666.00
2009/10	32.68	818.00
20010/11	32.58	536.00
20011/12	29.01	707.00

Source：data from 2004/05-2009/10 are from Myanmar Agricultural Statistics 2011, and data from 2010/2011-2011/2012 are quoted from Myanmar Agricultural at Glance.

Figure 4-3 Flow of Rice in Myanmar (2009-10)



Even though liberalization of rice export is functioning since 2003, development of rice industry is not well improved, which it needs to make the structural adjustment along the supply chain from farm to export. These may be listed among other things such as farmers' investment through sufficient credit, improvement of the quality seeds, pricing policy, land tenure system, elimination of the export tax, strengthening extension services, developing the farm inputs industries, improvement of milling facilities, infrastructures for export facilities and encouragement of private partnership.

To generate increased production of paddy, measures are also being undertaken in growing high yielding varieties, including introduction of hybrid rice varieties. According to the major tasks of the Ministry, adoption of 14 points Good Agricultural Practices in paddy cultivation and production of qualified and good high-yield seeds have been undertaken in 2011 paddy growing season.

4.4.2 Pulses

Presently, Myanmar is standing as a leading country in pulses production among ASEAN member countries. Major exportable varies of pulses are black gram, green gram, pigeon pea, soy bean, butter bean, cow bean and kidney bean. Cultivation of pulses, with relatively less expenses in cost of cultivation and increased demand consumption and export, has increased substantially from 0.73 million hectares in 1988-1989 to 4.5 million hectares in 2010-2011. Export of pulses increased from 17,000 metric tons in 1988-1989 to around 1 million metric tons in recent years. [26]

In the fifth year of Fur Short-term Five-Year Plan, 2010-2011 total sown area of pulses has reached at 4.50 million hectares with average yield of 1.28 ton/ha due to the adoption of improved varieties.

4.4.3 Oil Seed Crops

Oilseed crops also play a vital role in Myanmar's high consumption of cooking oil compared to other neighboring countries. Major oilseed crops include groundnut, sesame, sunflower, mustard and niger. As the amount of edible oil produced is not enough for local consumption, approximately 200,000 tons of palm oil is being imported annually to fulfill the local consumption.[27]

4.4.4 Industrial Crops

Cotton, jute, rubber and sugarcane are the main industrial crops in Myanmar. The yield of cotton remains stagnant at around 0.7 tons/ha for many years before 2008 and sharply increased 1.23 tons/ha in 2009 as a result of introducing modern variety of Ngwe Ghi 6 cotton which is being substituted in old varieties on long staple cotton. Production of raw cotton is only used for domestic textile industries.

Jute is widely in the Delta Region initially to substitute imports from India and Pakistan, but later to promote export since the country achieved self-sufficiency in Jute in 1966. After the introduction of summer paddy in1992, the area under jute over the past decades had drastically declined. Jute cultivation is more attractive for farmers due to disincentive price set by the State Enterprise.

Rubber is well aware of it economic importance and its role as exportable crop and also industrial raw material for local manufacturing industries. The old varieties are being replaced with new high yield

[26] Myanmar Agriculture in Brief

[27] Myanmar Agriculture in Brief

varieties to increase the yields.

Concerning **Sugarcane**, to set up the production and export of sugar, the Government established the Myanmar Sugarcane Enterprise (MSE) in 1994, which provides technical and extension service and distribute farm inputs to the sugarcane growers. Consequently, the area under sugarcane tripled during in 1995 -2008 period production increased more than three times. However, increases in yields were insignificant; increasing from 51 tons/ha to 61 tons/ha during the same period, indicating that the increased production has been achieved mainly through expansion of sown area. The small and medium scale sugar processing plants with centrifugal technology grew in large number in the private sector with the progress of changes from socialist economy to market economy. Starting from 2004 MSE gradually handed over two sugar mills to the Ministry of Industry (1) and six sugar mills were privatized to the union of Myanmar Economic Holding Co. Ltd. and Myanmar Economic Cooperation. Now all sugar mills are privatized.[28]

4.5 Infrastructure

4.5.1 Irrigation Facilities

At present, only about 6% of the total water resources of 870 million acres feet (1,072 billion m^3) per annum are being utilized annually. The measures for irrigation development are:

1) Construction of new reservoirs and dams
2) Proper management for the storage and utilization of run-off water from the watershed areas
3) Renovation of existing reservoirs for raising storage capacity and efficient delivery of irrigation water
4) Diversion of water from streams and rivers, during high water levels into adjacent ponds or depressions for storage with sluice gates
5) Lifting water from rivers and streams through pump irrigation
6) Efficient utilization of ground water

Before 1988, total irrigated area of the country was 1.00 million ha. Up to the end of March 20112, 235 of irrigation dam projects have been completed, increasing to the irrigable area of 2.29 hectares in total. Irrigation coverage increased from 12.5%of the sown area in 1987-1988 to 16.7% of the country as shown in Table 4-6.

Apart from the construction of dams, 327 river pumping stations have been installed to irrigate approximately 0.20 million hectares. Groundwater facilities of 8,312 tube wells (deep wells: 5,245, shallow wells: 3,067) were completed, covering 41,700 hectares.

Expansion of net sown area has been carried out by development of fallow land, cultivable waste land, and virgin land, but the expansion of irrigated area has not so increased, comparing with that of new sown area as shown in Table 4-6 and Figure 4-3. This trend arises from the following constraints;

1) Water resources to supply to the newly reclaimed areas is not exploited
2) Improvement of main and secondary canals has not been in progress due to deficit of budget

[28] Myanmar Agriculture in Brief , 2012

and cost increasing of land compensation

3) Depression of functions to deliver the irrigation water due to degradation of irrigation facilities such as dams and canals
4) Lack of efficient water management from dams to farm land

Although the construction of dams and pumping stations to exploit water resources is required, it is requisite to increase the irrigated area and rate by improving overall irrigation efficiency through formulating and implementing the efficient integrated water management system covering all irrigation facilities from main to terminal ones.

Table 4-6 Irrigated Area

Year	Net Sown Area (million ha)	Irrigated Area (million ha)	Irrigated Rate (%)
1987-1988	7.99	1.00	12.5
1996-1997	9.28	1.56	16.8
1998-1999	9.67	1.69	17.5
2001-2002	10.65	1.99	18.6
2002-2003	10.82	1.87	17.3
2003-2004	11.04	1.96	17.7
2004-2005	11.41	1.93	16.9
2005-2006	11.94	2.14	17.9
2006-2007	12.61	2.24	17.8
2007-2008	13.22	2.22	16.8
2008-2009	13.49	2.28	16.9
2009-2010	13.64	2.33	17.1
2010-2011	13.75	2.29	16.7

Source：Myanmar Agriculture in Brief 2012

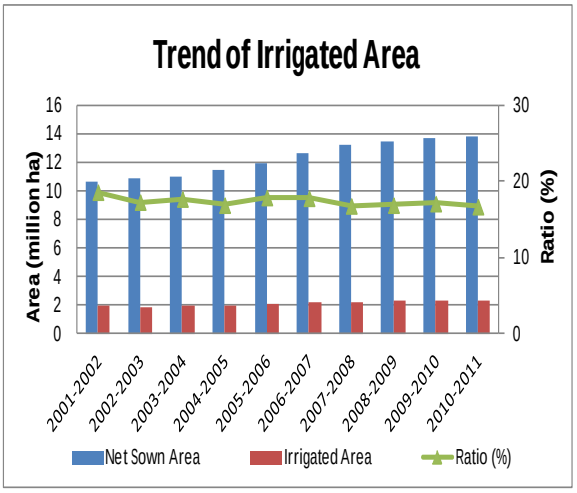


Figure 4-4 Trend of Irrigated Area

4.5.2 Land Productivity of Irrigated Area

According to a farm household survey conducted by a JICA Study Team for Two-Step Loan Project for Agriculture and Rural Development, annual income from irrigated area is lower than that from non-irrigated area. The tendency is observed in Central Dry Zone (CDZ), Southern Shan State, and Ayeyrwady Delta Region, and particularly the gap between irrigated and non-irrigated area is nearly 1 million kyat per annum in the CDZ.

The survey asked farmers whether they irrigate by crops, and most farmers who irrigate in the CDZ grow rice under irrigation condition. However, those farmers who practice irrigation for rice also plant groundnuts and other cash crops under rain-fed condition. Such cash crops including Pigeon Pea and Sesame are planted under rain-fed condition in CDZ, and profitability of pulses and oil crops are usually higher than that of rice.

Following table shows profitability of crops in Sagaing Region. Sagaing region is a part of CDZ but its area is longitudinally wider from South to North, blessing much rain for rice production than other regions in CDZ. The table indicated that the most profitable crops are Green Gram, Black Gram and Pigeon Pea, followed by Groundnuts and Sesame.

Table 4-7 Profitability of Crops in Sagaing Region (2012/013)

Crops	Cost (kyat/ha)	Yield (t/ha)	Price (kyat/kg)	Income (kyat/ha)	Net Profit (kyat/ha)	B/C
Paddy	601,700	4.6	191	878,600	276,900	1.46
Maize	507,800	3.1	277	858,700	350,900	1.69
Green Gram	345,200	1.3	734	954,200	609,000	2.76
Pigeon Pea	306,400	1.5	459	688,500	382,100	2.25
Black Gram	269,300	1.5	483	724,500	455,200	2.69
Groundnut	501,600	1.6	597	955,200	453,600	1.90
Sesame	385,500	0.7	989	692,300	306,800	1.79
Sunflower	326,200	0.9	534	480,600	154,400	1.47

Source: DOA-Sagaing Region

For rice, production cost is the highest and profitability is the lowest. But it is said that farmers prefer to grow rice if irrigation water is available, since rice is principal foodstuff for them. In addition, farmers had been forced to grow rice under the irrigation condition.

At present farmer can grow any crops even under irrigation condition. However, for long period, only limited crops, including rice, sugarcane and cotton, are allowed to grow in irrigated area. As a result, farmers and even extension officers do not know irrigation farming for other crops than rice. To increase profitability of irrigated land, it is necessary to extend irrigation farming method for profitable crops such as vegetables, and promote their production after rice or in a part of irrigated land.

4.6 Agricultural Inputs

(1) Agricultural Mechanization

Agricultural Mechanization has been carried out by utilizing farm machinery and equipment for various activities of agricultural production through the private sector participation in addition to the state sector activities. Increased cropping intensity has expanded the use of machinery in agriculture from land preparation to harvesting and post- harvest activities. Required machinery is being produced and assembled locally or imported for distribution to the farmers.

Efforts are being to totally eliminate the traditional way of threshing paddy on the threshing floor, through the introduction of threshers and combine harvesters. 23 model mechanized villages were established throughout the country to demonstrate the farmers on benefits of farm mechanization.

Land development activities for the transformation from conventional agriculture to mechanized agriculture are being undertaken as follows:

1) Construction of far-land roads
2) Construction of canals and drainage for irrigation purpose
3) Transforming small plots to one acre plots
4) Facilitating the purchasing process by introducing installment system for agricultural machinery in order to have access and affordable by farmers

The need for agricultural mechanization has been heightening due to the shortage of labor force during the busiest season for farming in many areas in Myanmar. Paddy after harvesting is left in the farm land for one month due to the shortage of labor force which results in degradation of rice quality. Farm mechanization has benefited the farmers in terms of time saving and human energy saving. In addition, it has contributed to increased cropping intensity of the country. Cropping intensity has increased from 132.7% in 1996-1997 to 171.4% in 2010-2011.

Transformation from conventional to mechanized agriculture will lead to establish modernized mechanized farmers throughout the country enabling farmers to grow double and multiple crops. It will be not only the quick win for farmers through increase of crop production but also for the increase of per capital income and job opportunities.[29]

Current land preparation works being carried out by using AMD and farmers' owned farm machinery are shown in the following Table 4-8.

Table4-8　Land Preparation Works by Farm Machinery

Land Preparation Works by AMD's Tractors				
Number of Tractors	Projected Area(1,000 ha)		Executed Area (1,000 ha)	Working Area per Tractor (ha)
	2011/12	2012/13		
1,257	138	130	116	92
Land Preparation Works by Farmers' owned Machines				
Number. of Tractors	No. of Hand Tractor	Total	Executed Area (1,000 ha)	Working Area per tractor (ha)
11,933	227,489	239,422	5,732	24
Mechanized % (116＋5,732)/Gross Sown Area(23,567)＝24.8% AMD 0.5%、Farmers 24.3%				

Source： Number of farm machines based on AMD (MOAI). Gross sown area based on Statistical Year Book 2011 P.125.

The above table shows that the % of farm mechanized areas for gross sown areas in the land preparation works becomes 24.8 % of which the works done by famers' owned tractors is 24.3 %. Although the tractors managed by AMD tractor stations only are carrying out only 0.5 % of the total preparation works, the large scale works by using big machines as AMD stations will be promoted in accordance with the improvement of infrastructures.　Considering 95 % of the farmers owned tractors are hand tractors, farm mechanization will be surely transformed from conventional draft cattle for cultivation works.

The current issues for introduction of farm mechanization are lack of infrastructures such as land consolidation works, access roads to farm plot, irrigation and drainage canals. Therefore, the utilization of big machines is not progressive. In addition, small farmers cannot purchase machinery outright due to high cost of machinery under the condition of saving deposit to borrow loan from MADB. It needs to study the farmer's capability to repay a loan for purchasing the minimum required machines. The productivity of agricultural crops will increase by getting a good efficiency through consolidating the large scale farm plots to introduce the farm mechanization. On the contrary, most of farmers are apprehensive that they will become mechanized poor due to a rapid decline of the price

[29] Myanmar Agriculture in Brief, 2012

and decrease of farm income.

The other issues are deterioration of farm machines possessed by AMD tractor stations and equipment for training at the training center for agricultural mechanization and a shortage of budget to introduce the new equipment and materials for training. In order to fulfill the agricultural mechanization, the following key issues should be paid.

1) The relation between development of non-agricultural sectors and wages earned by agricultural labor works
2) The system to provide the scope of services for agricultural mechanization

Concerning farmers who are introducing the large scale farm machines, It is necessary to analyze carefully the relation between the profitability for investment and the cultivable areas as a contractual base by using farm machines, geographical scope of cultivable services and marketing completion with other owners of machines.

4.6.2 Utilization of Fertilizers

The domestic fertilizer industry in Myanmar is concentrated around the production of urea fertilizer from the abundant sources of natural gas in the country. As requirement for plant nutrients, phosphate and potash fertilizers are imported. The Ministry of Energy prefers to export natural gas in order to obtain foreign exchange, and thus supplies of gas to the urea plant have been decreasing. Although imports of fertilizers are liberalized to the private sector, most of farmers are unable to acquire sufficient amount of fertilizer due to financial constraints.

The following Table 4-9 shows requirement and supply of fertilizers.

Table4-9 Requirement and Supply of Fertilizers

Year	Paddy Sown Area (million ha)	Requirement (t)	Domestic supply of Fertilizers (t)					Surplus/Deficit (1,000 t)
			Urea	T.Super	Potash	Compound	Total	
1997-1998	5.78	2,139,000	145,524	30,916	7,704	4,816	188,960	△1,950
1998-1999	5.76	2,131,000	215,483	11,802	5,884	547	233,716	△,1897
1999-2000	6.28	2,324,000	100,996	3,745	5,974	0	110,715	△2,213
2000-2001	6.36	2,353,000	219,101	11,796	6,269	0	237,166	△2,116
2001-2002	6.45	2,387,000	56,000	34,272	6,086	0	96,358	△2,291
2002-2003	6.49	2,401,000	10,651	48,112	10,280	0	69,043	△2,332
2003-2004	6.55	2,424,000	464	1,306	2,867	0	4,637	△2,419
2004-2005	6.86	2,538,000	19	162	247	0	428	△2,538
2005-2006	7.39	2,734,000	3,100	73	47	372	3,592	△2,730
2006-2007	8.12	3,004,000	4,494	195	7	3,152	7,848	△2,996
2007-2008	8.09	2,993,000	4,214	10	0	806	5,030	△2,988
2008-2009	8.09	2,993,000	4,050	0	0	3,274	7,324	△2,986
2009-2010	8.07	2,986,000	4,101	0	0	1,032	5,133	△2,981

Source: Paddy Sown Area, Supply of Fetilizers based on Myanmar Agricultural Stistics, 2011

Requirement of fertilizers is estimated by the JICA Survey Team Input of Fertilizer 3 bags/acre=370kg/ha for achieving Target Yield of Paddy, 100 basket/acre being equivalent to 4.94 tons/ha.

Requirement of fertilizers varies from 2.13 to 3.00 million tons depending upon the annual sown areas as seen in the above table. Supply of fertilizers amounted to 110,000 to 237,000 tons in 1997-1998 to

2000-2001, but has been extremely declining since 2001- 2002. This declining of fertilizer- supply comes mainly from the decreasing of urea fertilizer production. As shown in surplus/deficit of fertilizers, habitual deficit is occurred every year.

In order to supplement such deficit, various fertilizers are imported as shown in Table 4-10. In case of urea fertilizer, 14,823 tons are imported and 4,101 tons are supplied by domestic industries. The total amount of urea fertilizers becomes 18,924 tons which is equivalent to only 6 % of the whole requirement.

Table4-10 Import of Fertilizers (Unit: t)

Year	Urea	Ammonum Nitrate	Supper Phosphates or Chemical Fertilizer	Potassium Chhoride	Mineral or Chemical Fertilizer Containg,N,P,K	Anmmonium Sulphate	Other Mineral or Chemical Nitrogenous Fertilizer	Total
2004-2005	11,239	0	0	0	23	0	694	11.956
2005-2006	731	0	5,999	0	11,794	490	349	19,363
2006-2007	8,172	0	40	20	38,691	2,850	4,914	54,687
2007-2008	1,742	0	72	155	27,311	938	3,468	33,686
2008-2009	881	0	21	3	3,542	0	2,258	6,705
2009-2010	14,823	120	250	603	11,884	880	700	29,260

Source：Myanmar Agricultural Statsistics, 2011

Before 1993 fertilizers prices area heavily subsidized by the government, which has then removed the subsidies on all crops. Subsequently, market prices have rise to international levels and the government has also allowed the private sector to import and distribute fertilizer providing exemption of import tax. Despite a lack of competition in the fertilizer market, most enterprises find it difficult to make profit due to less demand for such expensive inputs. In fact, fertilizer is the most important component to improve crop productivity. So as to ensure adequate distribution of fertilizer at the price affordable by farmers, a subsidy program should also be reinstated by the State.[30]

4.7 Farmer's Associations

As mentioned in Chapter 2 DATA COLLECTION SURVEY 2.2 Policies on Agriculture, Livestock, Fishery Sectors (8) Farmer's Associations, there exist farmer's associations being setup by MOAI lead, but their activities are not practically functioning and awareness of farmer's ownership is not remarkable. Myanmar Farmer Association (MFA) was setup by and under Myanmar Rice Federation (MRF) as one of societies to petition against the government in terms of building the farmer's capacity as well as improving rural living conditions.

According to MRF, MFA was created that key persons of MRF felt necessity to organize national level farmers' organization through MRF's activities. MFA share information related to agriculture with member farmers and negotiates with the government based on the farmers' needs. The member farmers exchange information related to agriculture though mobile phone supplied by FAO in 2008. Details for the MFA's activities are discussed in 4.14(4).

MFA is negotiating with the government about distribution of fertilizers and seeds based on the

[30] Agriculture Development Issues and Strategies, Myanmar January 2011

information obtained from the interactive communication system. According to the news appearing on June 30th by New Lights of Myanmar, MFA is concerned in establishing Farmer's Enhancement Law. Moreover, MFA is going to setup the Farmer Extension Center at Kawthmu Township in Yangon Region to provide information services such as agricultural technologies and farm machinery. In future, the Farmer Extension Center will be established at every township.

4.8 Extension Services and Research and Development

4.8.1 Extension Services

The Department of Agriculture (DOA) is the sole government institution responsible for providing the public extension services to farmers such as crop cultivation, cropping systems, appropriate utilization of agricultural inputs, pest control in order to improve their living standards.

Agricultural extension organizations under the DOA are composed of state/region agricultural office, district/township agricultural offices. At each district or township office, manager or township manager is assigned as the leader and two or more assistant managers and accountants are working under the leader. Assistant managers are responsible for extension and input supply. The assistant manager who is in charge of extension is also managing the extension base or the extension camp as the Camp leader.

At present, most of these extension camps are not available due to deterioration. The extension camp consists of one to four village tract managers and four to eight village managers, and cooperates with district or township office for extension services.

4.8.2 Research and Development

The Department of Agricultural Research (DAR) under MOAI is the principal government agency involved in agricultural R&D. Other agencies under the MOAI also conduct research on production technology and agricultural economic development. These agencies are DOA, DICD, ID and Yezin Agriculture University. Agricultural Science Indicators (ASTI) survey conducted on research and development for Myanmar in 2007. The survey indicated that Myanmar is one of the Asian countries with the lowest numbers of trained researchers at the post graduate level.

(1) DAR

Mission of DAR is to systematically conduct research activities that would suite to the needs of all stakeholders, which include producers, distributors and consumers, and dissemination of regionally adopted crop varieties and crop production technologies. DAR's research focuses on increasing crop production through improved seed, crop management, and crop protection techniques, and cropping systems tailored to suit the country's various agro-ecological zones. Those research activities will contribute to enhancing the agricultural productivity. There are six major divisions under DAR.

1) Rice and Other Cereal Crops division
2) Oil Seed Crops and Food Legumes division
3) Industrial Crops and Horticulture division
4) Soil, Water Utilization and Agricultural Engineering division
5) Agronomy, Agricultural Economics and Statistics division

6) Biotechnology, Plant Genetic Resources and Plant Protection division

DAR also manages seven research centers and 17 satellite farms located at State/Regions as shown in Table 4-11 and Table4-12[31].

Table 4-11 Crop Research Center and Sattellite Farm

State/Region	Crop Research Center	Satellite Farm
Kachin State	0	1
Kayah State	0	1
Sagaing Region	0	2
Taningthari Region	0	1
Mon State	0	1
Mandalay Region	2	5
Magway Region	2	0
Bago Region	1	1
Shan State(South)	1	2
Shan State(North)	0	2
Sahn Staet(East)	0	1
Ayeyarwaddy Region	1	0
Total	7	17

Source: DAR,2012

Table 4-12 Satellite Farms and theis Mandate Crops

No.	Satellite Farms	Crops
1	Mohnyin	Rice
2	Pangon	Rice, wheat ,chickpea
3	Zaloke	Rice,wheat,chickpea,pigeon pea
4	Kyaukee	Riice, chickpea, sunflower
5	Kyauktada	Rice, groundnut
6	Myingyan	Pigeon pea, green gram, sorghum
7	Tatkon	Maize, groundnut, sunflower, chickpea, green gram
8	Aungban	Upland rice, maize, wheat, soybean, niger
9	Kyaukme	Rice, maize
10	Loikaw	Rice, maize
11	Thegon	Rice
12	Taryaw	Rice, soybean, sunflower
13	Naungmon	Rice, wheat , maize, soybean
14	Kyineton	Rice, maize
15	Sebin	Rice, maize, sunflower, green gram, pigeon pea
16	Dawae(7)miles	Pomelo, rambutan
17	Azin-2	Pomelo, rambutan, durian

Source：DAR, 2012

Total public expenditure in agriculture as a percentage of agricultural output included common research investment that helps to place a country's agricultural R&D spending. In 2003, Myanmar invested $0.06 for every $100 of agricultural output whereas the corresponding investment of $ 0.07 in 1996. This rate of reinvestment within agriculture sector is the lowest in the world. The average for Asia and developing world, for example, were $0.41 and $0.53 in 2000, respectively.

(2) Central Agriculture Research and Training Centre (CARTC)

CARTC is an umbrella organization of DOA, and is established in 1984, under technical cooperation by JICA. At the time of establishment, name of the institute was "Central Agriculture Development and Training Center (CADTC)", but in 1999 the name was changed to current CARTC, aiming at enhancing research function of the center. At present, however, research activity is quite limited to survey response of paddy to fertilizer application, and main activities of the center is providing trainings to DOA officials.

Figure 4-5 CARTC

To be more precise, as a training center for DOA extension officers, the center provides trainings for seedling, seed bed making, field inspection method to freshman/ woman and managerial officials of DOA. In addition, the center provides trainings on production technology of vegetables and fruits. The center also received technical assistance of JICA, namely "The Project for Agricultural Extension Human Resource Development" implemented from 2008 to 2010.

[31] Background Paper No.5 Current Situation and Future Opportunities in Agricultural Education, Research and Extension in Myanmar, USAID March 2013

The center needs enhancement of research function on new research subjects, including application of fertilizers and pesticides, pest control, and environmental issues. However, to perform the new researches, budget is not enough and capacity development of researchers is needed.

(3) Vegetable & Fruits Research & Development Center (VFRDC)

VFRDC is found in 1986 as a research institute under Horticulture & Bio-technology Division in DOA. As of October 2013, the center has 48 officials including around 30 researchers. However, capacity development of researchers is required since the center has only one doctor degree and 4 master degrees. There is 8 sections in Yangon including Vegetable、Fruits、Tissue Culture、Plant Protection、Soil Fertility, in addition to 8 research farms in the Union. Their main activities are production and sell of hybrid and certified seeds of vegetables and fruits, and extension of these seeds to farmers.

Figure 4-6 VFRDC

However, they cannot deal with new research subjects due to outdated research equipment, and procurement of new equipment including DNA analyzer, packaging machine, seed processing plant, etc., with capacity development of researchers are needed.

(4) Institute of Fishing Technology (IFT)

IFT was established as umbrella organization of Department of Fisheries in MOLFRD in 1982-83 under technical support of FAO with financial assistance from the governments of Norway and Denmark. Main activities of the institute are providing technical training to the government officials and private sector, with scarce activity of research and development. There are 3 training institutes under MOLFRD, including Pyapon Fisheries Training Center in Ayeyarwady region and Upper Myanmar Fisheries Training Center in Sagaing region, in addition to the IFT. The former two training center has 5 and 7 staff respectively, and the IFT has around 30 officials to provide diploma level education to trainees. At present, two doctors and two candidate doctor studying at overseas are working for the institute.

There are four sections in the IFT, such as Fishing Gear, Fishing Technology, Post Harvest Technology, and Aquaculture. They are also conducting ecological survey on Irrawaddy dolphin with support of Bay of Bengal Large Marine Ecosystem (BOBLME), which has a plan to implement biomass study with the institute from November to December in 2013.

4.9 Agricultural Credit

Farmers in Myanmar have several alternatives for borrowing money such institutional finances as Myanmar Agriculture Development Bank and Global Treasure Bank Public Co. Ltd., microcredit providers including PACT, OISCA, and other NGOs, and private money renders including local brokers and relatives. Interest rate of the institutional finance (8.5 %/year) is lower than that of the private money renders. However, since the banks

Figure 4-7 MADB

request mortgage, need more time to borrow money and provide quite limited loan amount, most farmers have to depend on the private money renders for conducting farming activities.

4.9.1 Myanmar Agricultural Development Bank

(1) Organization

MADB is one of the government-affiliated financial institutions, just as same as MEB, MFTB and MICB. However, the former 3 banks belong to Ministry of Finance and Revenue, MADB is one of subordinate organization of MOAI. MOAI was established in 1953, and was Agricultural Finance Division at the time of Union of Burma Bank under the socialist regime. Current legal structure was established based on Myanmar Agricultural Development Bank Law in 1990 and supplementary order in 1991. As of 2013, MADB has 206 branch offices in whole country. MADB law define that mission of MADB is to contribute socio-economic development of rural areas through providing financial services to agriculture and livestock sector, but the bank rend money only to farming activities at present.

(2) Loan Program

MADB has two types of program including Seasonal Loan and Term Loan. The Seasonal Loan targets crop production, whereas the Term Loan aims at procurement of farming tool and equipment such as working animal and agricultural machinery. Details of the programs are as follows.

Table 4-13 Loan Program of MADB

Item	Seasonal Loan			Term Loan
	Monsoon (Apr-Aug)	Winter (Sep-Dec)	Pre-monsoon (Jan-Feb)	
Purpose	Crop Production	Crop Production	Crop Production	Procurment of Farming Tool, equipment
Loan Term	1 year	1 year	1 year	3－4 year
Interest Rate	8.5%/year	8.5%/year	8.5%/year	8.5%/year
Grace Period	1 Crop Season	1 Crop Season	1 Crop Season	1 year
Loan Limit	100,000 Kyat/ac* (Max 10 acre)	100,000 Kyat/ac* (Max 10 acre)	100,000 Kyat/ac* (Max 10 acre)	Individual Assessment by MADB
Mortgage, Guaranty	Group-based Lending (5-10 person)	Group-based Lending (5-10 person)	Group-based Lending (5-10 person)	Real Estate (land, building)
Total Lending (2012)	426 billion Kyat	127 billion Kyat	4 billion Kyat	13 billion Kyat

Source: MADB (2013)
Note: 100,000kyat/acre is equivalent to 247,100 kyat/ha.

The crop is not limited to rice, but including maize, pulses and beans, oil crops, cotton jute, mustard, sugarcane and etc. However, among three seasons of the Seasonal Loan, 90% of Monsoon and 100% of Pre-monsoon are for rice production.

Loan amount is fixed by crops, and maximum loan amount of rice production is 100,000 kyat/acre (247,100 kyat/ha), while that of groundnuts and sesame are 20,000kyat/acre (49,420kyat/ha). However, the loan amount is not enough for rice growers since production cost of rice is estimated at 250,000 to 300,000 kyat/acre (617,700 to 741,290kyat/ha) according to MADB officials, and at least 200,000

kyat/acre (494,200kyat/ha) according to MRF.

(3) Eligible Borrowers

Eligible borrowers are the one who has land use right issued by land Record Department of MOAI. Illegal farmers who cultivate in forest areas cannot receive their financial services. Also, farmers in remote areas including Kachin State and North Shan State are difficult to borrow money, and have to depend on such informal money renders as local brokers and input suppliers. Following table shows financial source of farmers in Myanmar.

Table 4-14 Financial Source of Farmers

Source	Monsoon Season	Winter Season
MADB	69.9%	55.1%
Informal Sector	26.3%	36.7%
Microfinance	3.0%	6.8%
Other	0.7%	1.4%

Source: MADB (2013)

To increase loan amount to agriculture sector, the new Farm Land Law (March 2012) allows banks receive land use right as mortgage. However, most banks target urban population and it must be taken more time that rural farmers can receive their financial services.

4.9.2 Global Treasure Bank Public Co. Ltd.

Myanmar Livestock and Fisheries Development Bank (MLFDB) was established in February 15, 1996 as a private bank, and provide financial service to livestock breeders and fishery households. At present, the bank expands their business to trade, construction, transportation and services in addition to livestock and fisheries, and changes their name to Global Treasure Bank Public Co. Ltd.

Figure 4-8 Global Treasure Bank

The bank is a public company and capitalized at 35 billion kyat, 2 billion kyat (4,000 shares) of which was opened to the public on September 2011, then the rests went public in July 2012. Price of one share is 500,000 kyat and the bank has 70,000 shareholders. The bank has 60 branch offices in total with 1,200 staffs and 72,000 crlients as of October 2012. The client includes 68,000 depositors and 3,400 borrowers.

Main activities of the bank include financial assistance, financial loan, fixed deposit, current deposit, saving, remittance and money change. They have only one loan program, short term loan, and out of 243 billion kyat of total loan amount, 41% is livestock and fisheries sector, 29% is trade, 13% is construction, and restst are transportation and service sectors. Following table shows detail of the loan program.

Table 4-15 Loan Program of MLFDB

Item	Detail	Remarks
Program	Short-term loan	
Purpose	Financial service to livestock, fishery, trade, construction, transportation and service sector	
Duration	1 year	No grace period
Interest Rate	13%/year	Repay every 3 months
Loan Limit	Not more than 20% of capital and general reserve fund	More than 20%, approval of Minister of Finance and Revenue is necessary
Loan Limit (borrowers)	1/3 value of building and land title Aquaculture: 1-5 lackhs kyat/acre (247,100 to 1,235,500kyat/ha) Livestock: 20% of asset value	Aquaculture: Loan payment is divided based on progress of project
Eligibility Criteria	Fishery: License holder of Fishery Department Livestock: land title is registered at SLRD Recommended by TS Livestock & Fishery Officer	
Mortgage	Real Estate (land, building)	

Source: MLFDB (2013)

There is livestock and fishery officer in Township, and qualify number of livestock fo borrowers, and borrowers have to obtain recommendation issued by the officer. The recommendation is submitted to branch office of the bank, but final decision is made at Yangon head office.

4.9.3 Microfinance

Microfinance scheme is relatively easer for farmers to access, since the institutional finance require mortgage including real estate and deposit.[32] Before Microfinance Law (2011), MFIs had been an informal sector but they are formal organization after the law. However, those organizations which hold licence issued by Microfinance Supervisory Enterprise (MSE) are only 118, and cooperatives which account for more than 50% of licence holders, operate basically in urban areas.

According to hosehold survey conducted by LIFT[33], 80% of surveyed household borrows money, but beneficiary of microcredit is only 16%. The rests are 42% borrow from family or friends, 31% from local money renders.[34] Reason of borrowing money is buying food or emergency needs such as disease for poor households, whereas rich household contract a debt for procurement of farm inputs or investment.

(1) UNDP

Microfinance project was first introduced by Human Development Initiative (HDI) by UNDP in 1997. Under microfinance project of the HDI, international NGOs including EDA, Grameen Trust, GRET and PACT provide credit service.[35] From March 2006, UNDP entered into contract with only PACT, which manage microfinance at local level, whereas UNDP provides source of credit and conducts

[32] MADB exceptionally provides loan services not requiring collaterals but by group-based rending without mortgage

[33] Baseline survey result of 4,000 HH in 252 villages in Delta/ Coastal, Hilly and Dry Zone regions, implemented by the multi-donor Livelihoods and Food Security Trust Fund (LIFT) in 2012.

[34] Baseline Survey Result, July 2012, LIFT, (P61)

[35] Microfinance Industry Report, Myanmar, 2010, ACTED and the Banking with the Poor Network in collaboration with the Foundation for Development Cooperation (P9)

budget management. Target areas of the project are 26 Townships in Delta, Central Dry Zone and Shan, and the project is operated by 4 branches in 1 TS (totally 104 braches). Number of beneficiaries are 400,000, with loan amount of 60 to 65 million US$. PACT reports their project activities to UNDP periodically.

(2) PACT

In addition to the Microfinance Program (MFP) collaborated with UNDP, PACT established "PACT Global Microfinance Fund (PGMF)" in 2003. Financial sources of the Fund are USAID, DFID and LIFT (UNOPS), and number of beneficiary is 670 thousand including 98% of women, with 730 rending and 141 million US$ disbursement. Target areas are 26 Townships in Central Dry Zone and Delta region, and 20 TS are also received from microcredit support from MFP of UNDP.

According to PACT, around 40% of client is farmers, and rests are consisted by 40% of non-agriculture worker including livestock breeders, and 20% of workers in service sector. Detail scheme of MFP and PGMF are not so different, and repayment rate of both are 99.8% due to good design of scheme, culture of Burmese and contribution of project staff. Following table shows microfinance program of PACT.

Table 4-16 Microfinance program of PACT

Item	Detail
Purpose	Livelihood improvement of small farmers, livestock breeders, and service providers through provision of financial support
Duration	4－6 months
Interest rate	3%/month
Loan Limit	100 lakh /Acre, maximum 4 acre (24.7 million kyat/ha, max1.6ha)
Mortgage/ Guaranty	No mortgage is required, but Group-based Lending is needed. 5 members in 1 group, and 4 to 10 groups form 1 center, which can receive trainings
Guarantee System	Beneficiary Welfare Program is simultaneously implemented. Relief to victims by natural disasters, pests and disease. For example, relief amount to livestock death is between 50,000 to 100,000 kyat. Source of the relief is 1% of loan repayment, in addition to PACT's income.

Source: PACT (2013)

(3) OISCA

OISCA commenced microfinance program since 2008. The program has 3 scemes including targeting farmers, livestock breeders, and landless hoseholds. The scheme for landless is to support their small –scale business such as tanaka production, retailing shop management and etc. As of 2013, OISCA provides the service to 1,500 to 1,700 households, and repayment rate is 100% due to support from VT chairman who has associated with OISCA for long term.

To provide the microfinance service as wide area as possible, OISCA limit 20 to 30 households in a village. Detail of their loan program is shown in table below. Around 60% of total loan is for livestock sector development, 30% is for agriculture sector and rests is for small-scale business activities carried by landless households. For rending method, 5 borrowers form 1 goup to monitor each other, and

landless group participate in group monitoring meeting which is held once in a two weeks, and repay little by little through devided repayment method for 25 times.

Table 4-17 Microfinance Program of OISCA

Item	Target of Loan Program		
	Agriculture	Livestock	Landless
Purpose	Farming	Livestock Breeding	Small-scale Business
Duration	1 season (6 months)	1 cycle (9 months)	1 year
Interest rate	2.5%/ month	2.5%/ month	20%/year
Grace Period	1 season	1 cycle	-
Loan Limit	60,000kyat	60,000kyat	40,000kyat
Mortgage/ Guaranty	Group-based Lending	Group-based Lending	Group-based Lending
Repayment	lump sum payment	lump sum payment	divided payment (25 times)
Other Conditions	(1) participation in monthly meeting, (2) participation in meeting organized by OISCA	(1) participation in monthly meeting, (2) participation in meeting organized by OISCA	(1) participation in monthly meeting, (2) participation in meeting organized by OISCA, (3) participating in saving program

Source: OISCA (2013)

4.9.4 Private Money Render in Rural Area

According to The development study on Sustainable Agricultural and Rural Development for Poverty Reduction Programme in the Central Dry Zone, implemented by JICA from 2006 to 2010, 64% of farm household and 58% of non-farm household borrow money from others, mostly from local broker or relatives. The reasons of debt includes procurment of farm inputs, food for consumption, medical treatment, and education.

In rural area, farmers traditionally borrow money from local brokers. Under the traditional money rending sceme, famres have disadvantage, for example, farmers borrow 1 basket of seed before planting, and return 2 baskets of seed after harvest. The system has been practiced for long period in rural area, and most farmers do not have any alternatives since access to institutional credit is difficult for them.

Interest rate of the private rending including local brokers and rekatives is basically quite higher than the institutional financial sceme. For example, interest rate was 3% per month if farmer has gold for mortgage, but if not, farmer have to borrow with 5 to 10% of monthly inrterest rate. However, access to those private render is better for rural peoples. As a result, there is a case that farmers living in a climatically unstable region such as central dry zone have to give up their land in above their head in deep water.

4.10 Post-harvest and Processing

(1) Rice

Following diagram shows basic supply chain of rice in Myanmar. As of March 2013, 15,477 traditional rice mills so called “Huller” with production capasity less than 2t per day, 1,220 large-scale

rice mills with capacity of 15 t/day, 224 modern rice mill with capacity more than 40 t/day and 6 parboiling mill are existed.[36]

As for input supply, only government can provide certified seed, while sales of chemical fertilizers and pesticide were already privatized. At local level, rice farmers sell their product to local trader or broker who bring rice to mill. Milled rice and broken rice are transacted at Crop Exchange Center, then marketed to domestic and foreign market by broker, trader, or exporter. A part of broken rice is used for confectionery and alcoholic beverage, whereas rice bran is used for animal feed.

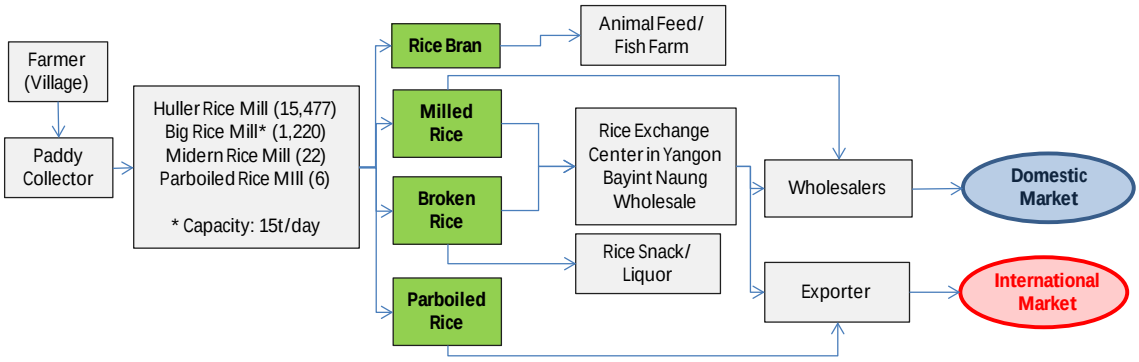


Figure 4-9 Supply Chain of Rice

According to MRF, around 90% of of state-own rice mill is privatized. However, more than 90% of rice mill, including Huller, have a quality problem, and modernization of milling technology is needed. In addition, post-harvest facility and equipment such as warehouse and threshing machine are not well developed. It is said that harvested paddy is left in field for 3 to four weeks after harvest, including in 10 to 20% of host-harvest loss of rice due to crack on rice. According to Shwe Phalar Mill, a private miller in the suburb of Yangon, extraction rate of rice is 60% including 30% of broken.

A private inspection company, SGS Myanmar Limited, said that a reason of high rate of post-harvest loss is poor seed management at field level resulting in heterogeneity intermixture. As a result, grains are mixed with different diameter which makes millers to adjust to smaller size grain to reduce rate of rice with husk after milling, which in turn result in high rate of milling loss. It also cause quality problem that different form of rice is mixed during transportation to Yangon.

(2) Oil Seed

Edible oil seeds including sesame, groundnuts and sunflower are quite impiortant agricultural products for Burmese. After harvest, sesame farmers pile and dry sesame with branch in field, and collect sesame seeds which come out from shell automatically after drying. Then farmers bring the seed to nearby Twon ship by animal cart, tractor or family car, to sell local collector or broker. The collector or broker bring a portion of sesame seeds as a sample to Crop Exchange Center which is usually located in center of Region or State. When the transaction is gone through, the local collector or broker send contracted amount of seed to their business partner such as edible oil millers, traders or exporters.

[36] "Background Paper No.6, Rapid Value Chain Assessment; Structure and Dynamics of the Rice Value Chain in Myanmar", Larry C.Y. Wong and Eh Mywe Aye Wai, March 2013

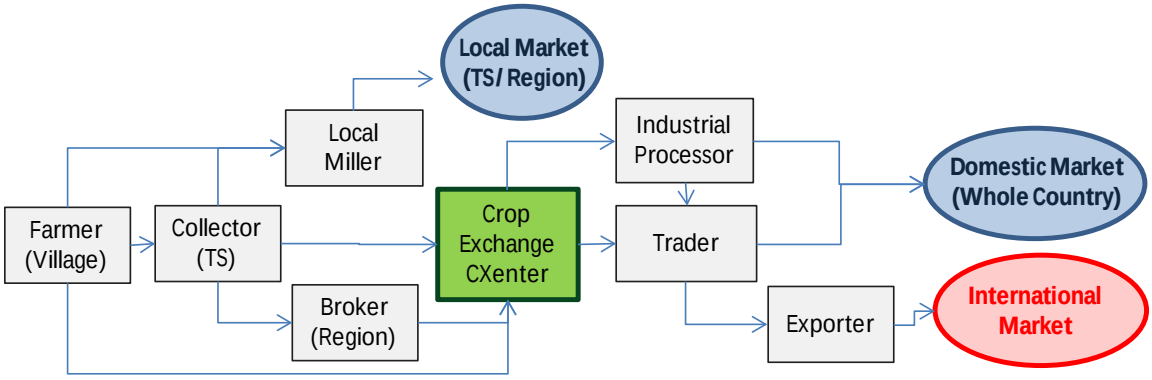


Figure 4-10 Supply Chain of Oil Seed

Usually, sesame for export to China and Japan is exported as a raw material form and extracted oil in abroad. However, sesame for Korea is processed to make roast sesame powder which is exported to extract sesame oil. The processing plant for roasted sesame powder is located in Magway and Yangon, and processing perocedure start from washing, followed by drying, roasting, cutting and packing for shipping. In Korea, export of raw sesame is posed 45% of import tax, but processed sesame is exempted from the tax.

On the other hand, goundnut is harvested without removing leaf and brach, and brought in backyard of farm household and removed from leaf and branch to dry in the sun. There are many oil extractor of groundnut oil in domestic market and most groundnut oil is consumed in the nation. According to a oil extractor in Myingyan, Triple Nine Great Integrity Trading Co., Ltd., the firm procure dried groundnuts from farmers and extraxt oil at their factory to sell to traders in Mandalay and Yangon.

Sunflower is mostly for seld-consumption and amount of transaction in the Crop Exchange Center is quite a few. Farmers usually extract sunflower oil in their home taking traditional way, which cause distinctive aroma and not good for sell. However, it is said that sunflower oil is better than palm oil since palm oil contains saturated fatty acid a lot, which is not good for human body.

(3) Pulses and Beans

Following diagram shows market chain of pulses and beans, which is basically similer to the chain of oil crops. After keeping some amount of product for home consumption, farmers sell their produce to local traders at nearby Township. Thereon, local traders including collectors and brokers bring sample to the CEC and sell to millers and traders.

At present, pulses and beans need to be processed (cleaned, pealed, sorted, and split) when exported to India, Singapore, Malaysia and Pakistan. However, buyers from China do not require the processing procedure. Therefore, most processing plants are established at Yangon. The following diagram shows typical supply chain of pulses and beans.

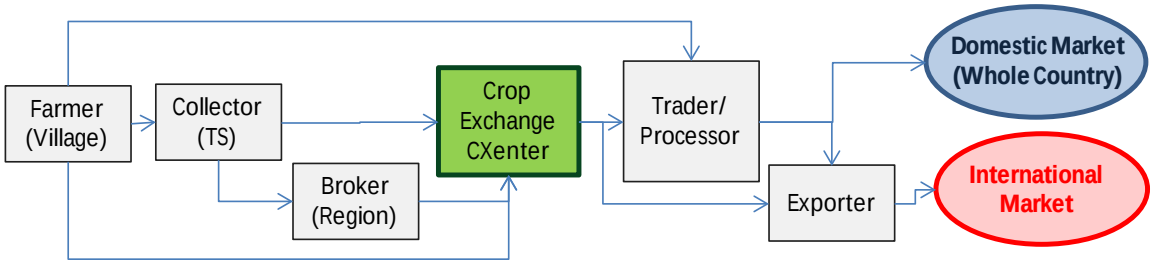


Figure 4-11 Supply Chain of Pulses and Beans

4.11 Farm Management

(1) Cropping Systems

Myanmar is divided into two main climatic regions, namely the tropical south comprising over two-thirds of Myanmar, and the sub-tropical, temperate north which comprises the remaining one-third of the country. There are distinct seasons; the dry season occurs from mid- October to mid-May and is followed by the wet season. There is a cold spell from December to February during the dry season. The southwest monsoon varies with both locality and elevation. Due to such variations in agro-ecological conditions, more than 60 different crops are grown in Myanmar. They can be grouped into seven categories as follows:

1) Cereals: Rice, wheat, maize, and millets.
2) Oil Seeds: Ground nut, sesame, sunflower, and mustard.
3) Food Legumes: Black gram, green gram, butter bean, red bean, pigeon pea, cowpea, chickpea, and soybean
4) Industrial crops: Cotton, jute, sugarcane, rubber, and tobacco.
5) Food crops: Potato, onion, chilies, vegetables, and spices.
6) Plantation cops: Tea, coffee, coconut, cocoa, oil palm, toddy palm, banana, & other frits
7) Miscellaneous crops: Other crops which are not listed in the above groups.

According to the baseline survey results by LIFT 2012, rice is clearly the most commonly planted monsoon crop, but not everywhere. Corn or maize was the most common in the hilly zone with 44 % of all households that grew monsoon crops planting it. Similarly sesame is commonly planted crop in the Central Dry Zone (35% of all households that grew monsoon crops). Ninety-eight % of all households that grew monsoon crops in the Delta/Coastal areas.

There is a greater diversity of post-monsoon crops planted compared with the monsoon plantings. Groundnuts are the most widely planted (16% of the households that grow post-monsoon crops). Rice is the next most common but is not widely planted outside the Delta/Coastal Zone.

The most common constraint to crop production is the lack of inputs or lack of money to buy them. Limited capital equipment (tools, daft animals, mechanical power) and land are also common constraints. Overall, constraints to crop production are generally with low-intensity production techniques that could be addressed with increased availability of credit, technical advice and improved access to land, and problems associated with lack of infrastructures for irrigation and water control.

(2) Land Holding

As mentioned in 4-3 Land Utilization in Myanmar, The present sown area is expanded by developing the arable wasteland for agriculture, but it would require capital investment to overcome the problems and constraints that limit crop production on these lands. The survey by LIFT in 2012 shows the following issues on access to land.

Land is the most important livelihood assets for households in rural Myanmar. Ownership of sufficient land can ensure income and food security. However ownership of land is not universal and highly inequitable in its distribution among the rural population. Within the sample of 4,000 households 50% of households did not own land. Only a quarter of households (26%) in the Hilly and Mountainous Zone do not own land while 72% do not own land in the Delta/Coastal Zone.

There are also big differences in the size of land holding. The very skewed distribution of land ownership in the Delta/ Coastal Zone raises concerns of equity when providing agricultural assistance in this areas unless programs target the quite small %age of small land owing households(owning say less than 5 acres). Landless participants reported that the opportunity for them to gain access to land for cultivation is very limited.

(3) Marketing

Based on the survey by LIFT, farm households organize themselves for group/collective marketing of their crops. Overall 90% of households sell their crops individuals and consequently have bargaining power with buyers and traders. House hold knowledge of crop process and access to price information is lacking. Nearly a quarter of households marketing crops had no price information before they sell their crops. Large land holders are more likely to have known the price of their main crops before selling them. Crop price information is predominantly from family and friends and crop buyers. The majority of households sell their main crop immediately upon harvest (62%). Only 17% of households sell their crops 2 or more months after harvest. Larger and wealthier agricultural producers are more likely to store and sell their crops some months after the main harvest season.

(4) Economy of Farmer's Households

According to a base line survey by LIFT (2012), family and friends are the most common sources of loans among households in the survey. 45 % of all households borrow from family and friends, and 31 % borrow from money lenders. Shopkeepers are the next most common source of loans (19%). Households with no land are most reliant on family and friends as a source of loan (48%), while only 21% of households owning more than 20 acres borrow from this source. Most of loans are for purchases of food (44%) clearly illustrating the importance of credit as a coping strategy for household food security. This is particularly the case for households that do not own land or have low monthly incomes.

4.12 Recent Trends of Marketing, Sale and Prices of Agricultural Products

As to market trend of agro-products, Market Information System (MIS) of Department of Agricultural Planning has collected related information on wholesale prices from domestic principal wholesale

markets and has made in public through The Agri-Business News (weekly, in Myanmar language), Monthly Price Bulletin (monthly, in English) and Agricultural Commodity Price of Domestic and International Market (annually, in Myanmar language) etc. MIS was established by Agricultural Market Information Service Project (completed in 2001) as an FAO's technical assistance, and "Monthly Price Bulletin" is an output of this support program, published since January 2000. MIS collects price-information on daily basis from wholesale markets in Yangon, Mandalay, Pakkoku and Myingyan, besides it weekly collects it from those of Monywa、Mawlamyine, Pathein, Pyay, Taunggyi (Shan), Thegone, Innlay, Aungbang, Nay Pyi Taw and Larshoe.

Apart from this, Ministry of Commerce has provided information on market trends and prices of international commodities on F.O.B. basis through UMFCCI toward various Associations. As public media, ther have been tellop information through Skynet, internet information called "Myanmar Trade Net", weekly magazine called "The Commerce Journal"[37], and etc. In this context, market price levels of rice, oil-seed crops and pulses have closely been linked with the trends in international market. For this reason, Ministry of Commerce recently initiated collection of market intelligence by opening Commercial Councils in overseas Embassies/Consulates and by positioning economic attaches who cover 9 marketplaces (in 8 countries), including Japan, China (Beijing and Hong Kong), India, Korea, Singapore, Thailand, United States and EU (Brussel).

4.13 Trade of Agricultural Products

The state of exports of major agro-products are summarized in the below table. As cereals, rice and maize constitutes export commodities, of which maize is mainly for feeds. As pulses, black gram, green gram, pigeon pea, chick pea etc have been exported, while as oilseeds, sesame and niger–seed have been exported.

Table 4-18 Major Exports of Agricultural Products (000'MT)

SN	Crops	1995/96	2000/01	2005/06	2008/09	2009/10	2010/11	2011/12
1	Rice	354.0	251.4	180.0	666.4	818.1	536.4	707.2
2	Maize	62.0	147.9	90.0	120.3	10.4	44.8	166.5
3	Black Gram	185.0	274.6	379.6	529.7	615.8	456.5	598.1
4	Green Gram	185.9	186.0	174.1	264.8	303.6	166.3	229.0
5	Other Pulses	238.7	370.7	323.8	656.8	312.5	206.6	469.3
6	Sesame Seeds	50.3	34.4	21.5	19.5	24.4	29.5	35.5
7	Niger Seeds	-	14.1	0.3	4.7	4.8	-	-
8	Onion	-	57.5	24.3	18.4	2.7	-	1.1
9	Tamarind	-	3.2	7.1	25.5	14.5	5.6	17.2
10	Oil Cakes	31.1	0.4	-	-	-	-	-
11	Raw Rubber	24.8	20.4	29.3	13.6	41.1	46.5	33.6
12	Sugar	-	3.2	1.0	8.7	58.3	-	-

Source: Ministry of Planning and Economic Development, Central Statistical Organization

On the other hand, the state of imports of agricultural products is as follows: As edible oil, oil extracted from sesame, groundnut, sunflower etc has domestically been processed, however, it hasn't met domestic demand, so the country has been obliged to import palm oil etc. Also, fertilizers,

[37] http://www.commercejournal.com.mm

agricultural chemicals, farm machinery etc are among imported commodities.

Table 4-19 Imports of Major Agro-products Commodities (Million Kyat)

SN	Item	1995/96	2000/01	2005/06	2008/09	2009/10	2010/11	2011/12
1	Spices	6.4	6.2	9.2	7.6	11.7	11.6	12.8
2	Edible Vegetable Oil & Other Hydrogenated Oils	448.1	474.0	571.0	1610.0	975.9	1122.2	2130.7
3	Fertilizers	135.2	20.1	26.1	12.6	59.8	82.6	109.1
4	Rubber Manufactures	199.8	171.1	140.3	258.2	350.9	338.1	425.5
5	Wheat Flour	10.3	0.7			1.8		1.3
6	Tobacco & Tobacco Manufactures	102.6	121.9	113.2	80.6	7.3	7.4	141.3
7	Cotton Fabric	53.6	66.5	74.6	184.3	141.1	132.0	80.4

Source: Ministry of Planning and Economic Development, Central Statistical Organization

4.14 Activities of Private Sector Groups/ Organizations

As major groups/organizations in agricultural sector, the activities of UMFCCI（Republic of the Union of Myanmar Federation of Chambers of Commerce and Industry） and agriculture-related associations under UMFCCI, MRF (Myanmar Rice Federation) and those under MRF, Myanmar Livestock Federation and Myanmar Fishery Products Producers & Exporters Association are briefed as follows:

(1) Republic of the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI)

The original form of UMFCCI has been Burmese Chamber of Commerce (BCC) that was established in 1919 under colonial reign, and later its name was altered twice then current union exist as ut is. It has 8 branch chambers in 7 Region (where Bago Region has been split into Bago East and Bago West), and also establishing 8 branch trade chambers (in which Shan State has been split into Northern Shanand Southern Shan) in 7 States, in addition, it has 9 Border Trade Chambers at the national borders with China, Thailand, India and Bangladesh. 53 associations belong to UMFCCI, of which major member associations in agricultural sector are tabulated below:

Table 4-20 Related associations to UMFCCI

#	Association
1	Myanmar Pulses, Beans & Sesame Seeds Merchants Association
2	Myanmar Edible Oil Dealers Association
3	Myanmar Fisheries Federation
4	Myanmar Livestock Federation
5	Myanmar Fruit and Vegetable Producer and Exporter Association
6	Myanmar Agro Based Food Processors and Exporters Association
7	Myanmar Onion, Garlic and Culinary Crops Production and Exporting Association
8	Myanmar Rubber Producers' Association
9	Myanmar Perennial Crop Producers' Association
10	Myanmar Sugarcane and Sugar Related Products Merchants and Manufactures Association
11	Myanmar Oil Palm Producers Association
12	Myanmar Farm Crop Producer's Association

Source: UMFCCI (Leaflet), though an association under MRF that became independent in 2012 was excluded.

Other than participating in Working Committee sponsored by the Government, major activities of UMFCCI include provision of consulting services for enterprises and groups in private sector, issu of certificates of origin for export commodities, such HRD activities as holding seminars and providing training courses, provision of information on trade/ marketing intelligence to member associations, business matching by trade fairs etc, mediation of reconciliation of disputes/troubled affairs etc.38

Besides, as its international activities in particular, trade promotion through introducing JV partners with overseas enterprises through the provision of consulting services, participation in international forum and trade fairs and activities of ASEAN Chamber of Commerce and Industry (ASEAN-CCI), Greater Mekong Sub-Region Business Forum (GMS-BF), Joint Economic Quadrangle Committee (JEQC) as a member organization are included.

(2) Myanmar Rice Federation (MRF)[39]

MRF (Myanmar Rice Federation) was formerly established in 2012 on the basis of MRIA (Myanmar Rice Industry Association), as a representative organization of rice producing farmers and rice agents. Currently, it has separated and become independent from UMFCCI , deploying activities as a partner standing on equal footing therewith, to which the following 5 associations (Strategic Partners) and 2 enterprises belong.

Table 4-21 MRF-related associations

#	Association
1	Myanmar Rice Millers Association (MRMA)
2	Myanmar Rice and Paddy Traders Association (MRPTA)
3	Myanmar Paddy Producers Association (MPPA)
4	Myanmar Farmers Association (MFA)
5	Myanmar Agribusiness Public Corporation Ltd (MAPCO)
6	Myanmar Fertilizer, Seed and Pesticide Entrepreneurs Association (MFSPEA)
7	Rice Specialization Companies (RSC)

Source: Myanmar Rice Federation (MRF)

Members of MRF consist of rice producing farmers, post-harvest treating agents, marketing agents, sale agents, export agents etc, number of which counts about 300 thousand as of 2013. Its objectives of the establishment include development and strengthening of rice supply chain, fortification of the system of food security through improved rice productivity, thereby harnessing competitiveness of rice exports. It also provides such support on rice trade as business matching towards overseas buyers. According to MRF, it initially started as a member of UMFCCI, but now it stands equal status to it.

Its activities range from input supply of seed, fertilizers, agricultural chemicals to rice exports. Thus, as a representative of rice industry covering the whole rice supply chain, it provides information on various support services for its members and maneuver to the Government. In its activities of studies and researches, it has carried out survey on production costs and actual status of producer's loan utilization etc.[40] Also, it provides capacity development for individual farmers, for which about 50

[38] UMFCCI Leaflet

[39] http://myanmarricefederation.org/content/about-myanmar-rice-federation-mrf

[40] A latest studies are "Study of Socio-demographic Characteristics and Impact of Contract Farming on Rice Farmers' Performance in Myanmar (MRIA, April 2012)", "Study of Rice Production of Farmers and Their Benefit on Rice Production in Myanmar (MFA,

trainer staff have been nurtured for providing training services.

(3) Rice Specialization Companies (RSC)

Rice Specialization Companies (RSC) is a network of entrrprises under thr umbrella of MRF, a network organization of rice industries constituting one of various crop specializing companies (CSC) organized in Myanmar. As of 2013, this company is composed of 58 enterprises engaged in rice production, processing and marketing.

Out of these members, 38 enterprises are engaged in rice production, and according to MRF, actually operating enterprises as of July 2013 are 3, including Ayeyar Hinthar Co., Ltd., Gold Delta Company Limited and Wakhema Trading Co., Ltd. Also, according to MAPCO, the reason why the operation rate is so low lies in repayment of loans by the granted farmers tended to have been defaulted owing to climate anomality, and this resulted in aggravated fund operation of the member companies. Major activities of RSC in concentrated on comprehensive and effective operation of rice production on contract-basis, including such activities as provision of seasonal loan to member farmers, leasing of seed, agricultural chemicals etc, purchase of harvest etc.

(4) Myanmar Farmer Association (MFA)[41]

Myanmar Farmer Association (MFA) is an organization under the umbrella of MRF, established in September 2012, under which around 100 branch associations are set up all over the country. Number of individual member is counted at about 200 thousands, of which 90% are farmer mainly producing rice, and the rest 10% are engaged in livestock and fisheries production. Its branched system comprises in the descending order from Region/ State, Township, Village Tract down to the terminal Village level, in which representative of each branch is elected through vote in the election by the branch.

According to the representative of MFA, recognized necessity of organizing a system of arranging technical training and support to marketing for the farmers who don't have their own organization representing their interests (established in 2008) gave the occasion to establish the MFA. This necessity has arisen from the course of MRF's activities. With such a background, Joint General Secretary of MRF also acts as the president of MFA as of 2013.

MFA deploys its activities with the objective of sustain the member farmer's socio-economic livelihood, and its supporting activities consist of not only technical assistance for improving farm production, support on production and marketing, but also education toward farmers and their family members, health and other forms of social support. In this context, farmers are defined as those who are engaged in agriculture as their major vocation, cultivating/ managing their own farmland by means of their own farming means, or those who are engaged in or manage rearing/ feeding of livestock, and the definition further covers those who perform agricultural services, agricultural/ breeding workers, those who cannot be engaged in farming due to high age but still perform agricultural services.

In this membership, member fee is not collected from farmers. According to MFA, this is because

March 2013"

[41] http://myanmarfarmer.org/?q=company

MFA follows a principle of adjusting/ ccordinating individual interests among members who covers the entire market chain, and providing services this advantage of coordination. Also, making use of revolving fund yielded from 10 million US$ received from the Myanmar Government, MRF has provided a short-term (6 months) loan free of interest to member farmers. Furthermore, two-way communication making use of mobile phone has started from 2013 by the support of WFP. MFA collects information from farmer's side on their family member composition and farming state on one hand, information on commodity prices and member farmers' statistical information etc are distributed from MFA to the farmers, on the other. This project has been implemented in 11 TS in Ayeyarwaddy and Bago Region as a pilot project.

(5) Myanmar Pulses, Beans & Sesame Seeds Merchants Association (MPBSSMA)[42]

This association was established in 1992, while as of 2013, 917 members including brokers, marketing agents, export agents etc belong to the association. Its office has been placed in the building of UMFCCI headquarters (Yangon) where 37 members of Central Executive Committee (CEC) and 39 members of Executive Committee (EC) have been appointed by Ministy of Commerce to manage the association. Foreign import agents are not authorized to affiliate as its member.

Its major activities include provision of such market intelligence as market prices, arrangement of matching with overseas buyers, issue of certificates of origin etc. It entrust quality inspection to SGS and OMIC. The inspection for certification is executed prior to loading commodities to be inspected on board, then the entrusted organ executes inspection of the commodities based on the standard specified by Ministry of Commerce, and after the inspection the certificate is issued by the association.

(6) Myanmar Fruit and Vegetable Producers and Exporters Association (MFVPEA)

This is one of NGO organizations established in 2003/4, to which 3,500 members currently belong. It is a component organization under UMFCCI and it supports exports of horticultural commodities, proposes policies to the Government, carrying out market studies, provides capacity building (on production techniques, marketing) etc, with the objective of assisting vegetables/ fruits producers and trading agents.

(7) Myanmar Rubber Planters & Producers Association (MRPPA)

MRPPA was established in March 2005 with the objectives of improving productivity and quality of natural rubber produced in Myanmar, export promotion and foreign currency earning as well as improving income/ living standard of rubber producers and processors. Number of association members counts about 200 in Yangon and over 1,000 at country level, composed of producers, processors, traders, exporters and manufacrers of rubber products etc of natural rubber.

Its major activities include supporting improvement on quality and productivity to members, provision of information on the newest technology, market trend, prices etc, providing training, workshops, seminars and supporting participation of members therein, trading/ export promotion of natural rubber, appeal/ lobbying to Government agencies, providing matching with investors etc.

[42] http://mpbsma.org/index.php?option=com_content&view=frontpage&Itemid=1

(8) Myanmar Food Processors and Exporters Association (MFPEA)

This association is an NGO established in August 2006, under the auspice of Ministry of Commerce, aiming at quality improvement of domestic agro-products. It is one of the member associations under UMFCCI, to which about 300 member enterprises currently belong including processing manufacturers of vegetable oil, coffee, instantly served noodles, seasonings etc. It has a laboratory for food inspection, in which modern testing equipment has been installed by a grass-root non-reimbursable aid fund of the Embassy of Japan. Coupled with simultaneously provided staff training in Japan with this equipment provision, the inspection system has been operated since November 2010 as currently managed by the association. Further, assistance by WHO is hereafter expected to this laboratory.

Its major activities include not only services of inspecting food composition and nutrition testing, water as well as microbiological testing by the request of member enterprises, but also distribution of information on international standards on foods, consultation on knowhow for improving food quality and training on hygienic treatment and management of food. Besides, it jointly publishes "Myanmar Food Industry Directory" with MMRD (Myanmar Marketing Research & Development Co., Ltd) that covers the entire industries related to foods in Myanmar.[43]

(9) Myanmar Agribusiness Public Corporation (MAPCO)

MAPCO was established as a public limited company in 2012. The company's stock is entirely owned by private sector since the objective of its establishment is placed on mobilizing fund investment of private sector to agribusinesses. MAPCO has so far invested to such business activities as rice-food processing complex, trade of agro-products, rice marketing, consolidation of agricultural infrastructure, generation of renewable energy and loan granting service.

(10) Myanmar Livestock Federation (MLF)

MLF was established on 24th October, 1999, holding around 14,000 members under its umbrella. The federation has the following 12 member associations.

Table 4-22 MLF-related Associations

#	Association
1	Livestock Feed Association
2	Animal Health Products and Equipment Importers Association
3	Mythum Farmers Association (Chin State)
4	Myanmar Dairy Association
5	Animal Products Exporters Association
6	Pig Farmers & Processors Association
7	Myanmar Apiculture Association
8	Egg Producers & Distributors Association
9	Pet Breeders Association
10	Broiler Association
11	Cattle, Sheep & Goat Farmers Association
12	Myanmar Livestock Resources Development (MLRD) Association

Source: Myanmar Livestock Federation（MLF）

[43] http://www.myanmarfoodindustry-directory.com/default.aspx

It represents private groups of livestock sector, tackling with coordination/ problem solution on the whole livestock supply chain ranging from producers to processing/ marketing agents and exporters. It holds regular meeting every Tuesday at its headquarters where representatives of member associations gather to consult with their issues and how to cope with them as federation. In addition, it extends such activities as petitions to related ministries, announcement/publication to mass-media, dissemination of knowledge/ information through its network, provision of seminars, elucidation of market trends, promotion of agri-business, various studies/ researches for supporting its member associations.

(11) Myanmar Fisheries Federation (MFF)

It was established in 1989, while it was as old as 1919, in the colonial era when its mother organization, ”Burmese Chamber of Commerce” had been founded. It consists of the following tabulated 9 associations with around 30,000 members, establishing its regional federation (branch) in each State/Division. Its major activities are: enlightenment of members, lobbying actions to Government agencies, holding workshops, support to restoration of damages by natural disasters etc.

Table 4-23 MFF-related Associations

#	Association
1	Myanmar Shrimp Association
2	Myanmar Fish Farmers Association
3	Myanmar Fishery Products Processors and Exporters Association
4	Myanmar Aqua-feed Association
5	Myanmar Marine Fisheries Association
6	Myanmar Freshwater Capture Fisheries Association
7	Myanmar Crab Entrepreneurs Association
8	Eel Entrepreneurs Association
9	Ornamental Fish Entrepreneurs Association

Source: Myanmar Fisheries Federation（MFF）

4.15 Role and Current Situation of Women

In Myanmar, gender equality has been secured by Article 22 of the Myanmar’s new Constitution (otherwise called 2008 Constitution). In this connection, Department of Social Welfare of Ministry of Social Welfare and Rescue/ Restoration takes charge of addressing to gender (in particular, removing discrimination and serving empowerment). There is a historical background behind this equality, since the Beijing declaration in 4th world women conference in 1995, the Government has radically tackled with gender issues. In the following year of this declaration, Government of Myanmar established an organ coping concretely with gender issues called “Myanmar National Committee for Woman’s Affairs (MNCWA)” and its working group, “the Myanmar National Working Committee for Women`s Affairs (MNWCWA)”.

In this Study, an interview survey was carried out, in place of field study, at three organizations, namely, “Myanmar Women`s Affairs Federation (MWAF)”, under the control of MNCWA, established with the special objective of securing women’s safety, “Myanmar Maternal And Child Welfare Association (MMCWA)” aiming at maintaining health of maternal women and “Myanmar Women Entrepreneur Association (MWEA)” with major objective of activities for business women. Through these interviews, the Study Team gas studied status and roles of women in Myanmar and current actual

state of these subjects in rural villages or in agricultural sector. These interviewed organs are country-wide ones, major activities of which include not only education targeting women/ girls, health care (reproductive health, AIDS, malaria, tuberculosis etc) but also widely deploying provision with microfinance toward rural women as means of preparing opportunities of involving in economic activities. The reason why microfinancing is targeted on women instead of men lies in the fact that women are in many cases responsible for maintaining livelihood/ economic management at home, so it is considered one of readily practicing activities as means of empowering women.

In the result of a development study by JICA "Sustainable agricultural and Rural Development for Poverty Reduction Programme in the Central Dry Zone" has also identified that decision making on treatment of family property and purchase of assets is made by both spouses, and that mothers mainly manage household account/ livelihood. In this report, it is reported that women in the study area receive relatively equal treatment in a family. In the first place, no case has been observed in which superiority of property succession is given to sons rather than to daughter.[44] The same answer has been given to this matter in the interviews made in this Study. In many cases, equal division of inherited assets is made among children, for example, if a family has 5 children, the inherited assets are divided into 5 without any difference by gender. Besides, as to access right to land assets, 95% of land-owners are male in the cases of married households[45], but 41% of unmarried women, 67% of widow women and 58% of divorced women also own land, implying that access to land ownership is also available for women.

As such, in the cultural background in which women's status is by no means lower than men, various origins are found such as dual-linear society has prevailed in which basically no cases happen of either one side of gender has superior status to the other side, in addition commonly the nuclear family is inj many cases established not in a hereditary way but after the marriage, thus the cases in which women is put under the yoke of "house clan" are comparatively few.

Also in the division of farming practices, according to what is told by women stemming from rural areas, women take initiatives to cover all the cropping process from seedling planting to harvest, while men mainly take charge of rearing livestock that needs heavy labor.

It is often said the fact that only husband is decision-maker in a family is nothing but a form of culture,

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[44] Cases also arise that priority of succession is given to the eldest child, but it is said that even in such cases no gender difference is considered. Though land proprietorship resides in the country, land inheritance has legally practiced in a form that land cultivated by former cultivator is secceeded by successors. In many cases wives marry with inherited farmland (cultivation right) from their fathers, inheritance of farmland (cultivation right) has been practiced regardless of whether they are sons or daughters. Also, in succeeding assets including farmland (cultivation right) to children, there is no particular legal clauses but in many cases more assests are succeeded to poorer chilren, a tendency of treating equally children regardless of gender (referring to "Sustainable agricultural and Rural Development for Poverty Reduction Program in the Central Dry Zone")

[45] Since farmland (cultivation right) is registered as property of a family as a rule after marriage, 95% of men or husband become and owner in married households. (aacording to "Sustainable agricultural and Rural Development for Poverty Reduction Program in the Central Dry Zone")

not at all a form of discrimination. As proverb says “father is the head of a family and mother is the neck”, it is interpreted that relationship between spouses is mutually complemental. However, a culture under which women have various labor burdens such as household chores/ nurturing children in addition to farm labor on one hand, while only men have “decision making right” as well as “representing right” on the other, is considered detrimental because difficulty arises from such a culture of reflecting women’s opinions in policies wthin household or in a society, thus it can otherwise be interpreted that equality of right between gender is culturally not guaranteed.

CHAPTER 5 STATUS OF DEVELOPMENT PARTNERS IN AGRICULTURAL SECTOR

The following gives a summarized outline of assistance in agricultural sector by aid organizations in which the Study staff conducted interview surveys during the period of the Study.

5.1 United Nations Development Program (UNDP)

5.1.1 Human Development Initiative (HDI-IV)

Human Development Initiative（HDI-IV）that UNDP tackled since 1994 was completed in December 2012, and the organization is carrying out a New Country Program with 3-years schedule beginning from January this year to 2015. It positions current stage of development as a transient period, with an intention of monitoring the result of coming general election in 2015.

HDI-IV is a general name of the following three projects that UNDP has carried out in Myanmar. Particularly, targeting an impact to grass-root level, it has tackled in such sectors as primary health-care, environment, HIV/AIDS, training and education, food security etc. livelihood improving activities it has provided includes agricultural assistance, and they were implemented in ICDP, CDRT and Microfinance Projects. ICDP was carried out targeting central dry land etc, while CDRT was implemented targeting state-border areas.

Table 5-1 Outline of UNDP Projects related to Agriculture

#	Code Number	Project Name
1	MYA/01/001	Integrated Community Development Project (ICDP)
2	MYA/01/002	Community Development for Remote Townships Project (CDRT)
3	MYA/01/003	HIV/AIDS Project
4	MYA/01/004	Microfinance Project
5	MYA/01/005	Integrated Household Living Conditions Assessment Project

Source: UNDP

Out of three projects dealing with HDI-IV, CRDT includes agricultural component, the outline of which is shown in the below table.

Table 5-2 Outline of CDRT Project

#	Item	Contents
1	C/P Agency	Ministry of Frontiers and others
2	MOU date of signature	In 1993（signature on Phase 4 was done in December 2002）
3	Project Name	Community Development for Remote Townships Project（CDRT）
4	Target Area	The project was implemented in 6 areas located in remote regions （26 TS in Northern Rakhine State, Eastern Rakhine State, South Chin, Northern Chin, Kachin, Mon and Kayin）, targeting 1451Villages.
5	Project Period	1994 - December 2012 The period consisted of 4 Phases, namely Phase 1（1994－1996）, Phase 2 (1996－1998),, Phase 3 (1999－2001) and Phase 4（2003－2012）
6	Project Cost	The total project cost amounted to 56.1 million US$. Its breakdown into 4 phases was、Phase 1（1 million US$）, Phase 2（10.9 million US$）, Phase 3（9 million US$） and Phase 4（35.2 million US$）
7	Objective	The project targets were remotely located 6 areas（beneficiary persons: 804,389, households: 142,788HH）, aiming at human development , and implemented with special

		importance attached to participatory approach.
8	Staff engaged	In total, 385 staff participated in this project, stationed at Village Level to deploy the project attaching importance to participatory activities.
9	Activities	Major activities covered developing Capacity of Communities, providing Primary Health Care as well as Community Water Supply and Sanitation, Primary Education and Environment/ Food Security. It also implemented components on livelihood improvement including agricultural support, such as farmland reclamation (4,118ha, with the beneficiary of 10,909HH), construction/ rehabilitation of irrigation canals (677canals, 21,660HH), construction of dams (24dams, by which 774HH benefited), development of sprinkler irrigation (3,993 acre, 8,003HH), construction of warehouses (1,227 sites, 4,657HH), distribution of HYV seeds (for 5,312ha, by which 32,103HH benefited), introduction of coffee plantation (190,764 trees, for 1,830HH), creation of terrace farming (1,247ha, in which 5,227HH participated), creation of Rice/ Grain Bank（2,142Banks to which 86,458HH joined）, introduction of orchard tree plantation (6,735,479 trees, 24,665HH), livestock raising (233,917 heads, 128,072HH), Community Forestry (263,082 seedlings, 11,956HH), distribution of stoves with high combustion efficiency (6,477nos to 11,670HH) etc.
10	Progress	Completed in December 2012.

Reference: http://www.mm.undp.org/HDI/ICDP.html

5.1.2 New Country Program (duration: 2013－2015)

New Country Program was provided by integrating five different activities as a follow-up action just after the completion of HDI IV. It consists of three pillars, namely: a) Sustainable Inclusive Community Development, b) Climate Change, Environment, Energy and Disaster Risk Reduction, and c) Policy Advocacy, Analysis and Democratic Governance in which the activity of livelihood improvement including support for agriculture has been adopted as a component of a).

The total project cost amounted 150 million US$ for 3 year's project period, and the project targets to cover the whole territory of Myanmar, in which number of ministries and governmental agencies take part, including Ministry of National Planning and Economic Development, Ministry of Border Affairs, Ministry of Environmental Conservation and Forestry, Ministry of Cooperatives etc. This project just started from this January, and the current stage is considered as a transient one and it is expected that more concrete activities will be deployed from now on.

5.2 United Nations Office for Project Services (UNOPS)

Livelihood and Food Security Trust Fund (LIFT) is a multi-donor fund established in March 2009 aiming at reducing poverty and famine as a MDG, and its head office is opened in UNOPS. Donors of this fund include 10 countries/ regions, namely: Australia, Denmark, the Netherland, New Zealand, Sweden, Switzerland, UK, EU, France and USA. A decision has already been taken to extend valid period of the program to 1028.

The LIFT program also has many associated NGOs including ADRA, IDE, NAG, etc. The beneficiaries of this program are mainly small-scaled farm households and landless farmers, but they also include large-scaled farm households who employ landless inhabitants. The target areas of this program range Ayeyarwady Delta, Central Dry Zone, Shan State, Kachin State and Rakhine State.

Table 5-3 Outline of Agriculture-related Projects by UNOPS

	Project Title	Target up to end 2016	Cumulative Results to Dec 2011	Percent of Target (%)
1	Agricultural Production (crops)	95,892	53,660	56%
2	Livestock Production	16,540	9,744	59%
3	Fishing	16,260	8,139	50%
4	Other Income Generation Activities (IGA)	17,261	15,335	89%
5	Credit	53,198	8,713	16%
6	Micro-finance for Captured Fishery Production	25,099	8,713	35%
7	Revolving Fund	13,594	2,112	16%
8	Training	109,682	62,646	57%
9	Assets and Infrastructure (water supply pond, provided through cash-for-work, grants etc.)*	788	182	23%
10	Community-based organizations (CBOs) and Local NGOs	CBO:4,002 NGO:1,440	CBO:766 NGO:766	CBO:86% NGO:53%

Source: LIFT Annual Report 2011

Note: Target of Assets and Infrastructure is construction and rehabilitation of Water Supply Pond

This program deploys activities to achieve the expected outputs as shown below:

Output 1; Improvement of agricultural productivity and farmer's income (improving agricultural production, post-harvest treatment techniques, access to markets of agricultural inputs),

Output 2; Improvement of off-farm income and off-farm livelihood means (providing fund for such off-farm activities as fisheries and marketing activities),

Output 3; Sustainable resources management and environment conservation for sustaining livelihood,

Output 4; Effective social protection measures for chronic poverty strata such as income improvement, strengthening earning opportunities for livelihood, protection of farm assets.

Output 5; Increased food security for poverty-prone strata and developing/ fortifying capacity of civil society for safeguard of routine life

Output 6; Monitoring /evaluation for providing better program implementation and development policies.

LIFT conducted a study during the period of 2013 - early 2014 in Central Dry Zone covering from water resources development - management to marketing, and an agricultural support mainly targeting at pump-irrigation has been scheduled for its activity based on water resources development. According to WURD, MOU has been exchanged between WURD and LIFT on 14th October 2013. It plans to launch a project including a component targeting rehabilitation of irrigation facilities, organizing WUA, capacity building of government staff and farm households, during four years from 2014. According to this schedule, LIFT is to provide a project of worth 5 million USD at Sagaing, while AFT is to provide another project worth 3 million Euro at Magway.

5.3 Food and Agriculture Organization (FAO)[46]

Myanmar became a member country of FAO in 1947, while it was in 1978 that FAO opened its office in Myanmar. Since then, for 36 years, FAO has continued its support activities in wide sectors

[46] http://www.fao.org/countryprofiles/index/en/?iso3=MMR

including agriculture, livestock and fisheries, The support provided by FAO includes not only Technical Cooperation Program (TCP) in which self-provided fund of FAO is utilized but also other forms of support by Trust Fund system are provided. As of 2013, FAO is implementing the following projects in Myanmar.

In crop production, FAO has had a broad approach ranging from the support for production of rice, cassava etc, to that of vegetables and fruits. It has also provided support on livestock and fisheries. In the livestock sector, FAO assisted School Milk Project that is promoted by the initiative of the President. Out of the following project list, support for seed production listed as #1, and that for rice production listed as #23, along with Oil Crop Development Project (2009 - 2013) that has been completed in April, 2013 are the projects C/P of which is DOA.

Table 5-4 Outline of FAO Agriculture-related Projects

	Project Name	Duration	Budget (US$)	Remarks
(1) Technical Cooperation Program (TCP)				
1	Food security through the strengthening of the institutional capacity for seed production	2011-2013	385,000	Seed
2	Capacity building to improve market access for fish and fishery products	2012-2014	298,000	Fishery
3	TCP Facility	2012-2013	281,479	
4	Accelerating the Development of Hybrid Rice in Myanmar	2013-2015	230,000	Rice
5	Royal Jelly Production in Myanmar	2013-2015	202,000	Beehive
6	Emergency support to affected communities in Rakhine State	2013-2014	500,000	
7	Enhancing milk consumption and livelihoods through school milk programs linked to smallholder dairy operations	2011-2013	490,000	Dairy
8	Capacity Development to Reduce Post-harvest Losses in Horticultural Chains in GMS Countries	2011-2013	451,000	Horticulture
9	Capacity Building for Spread Prevention and Management of Cassava Pink Mealy bug in the Greater Mekong Sub region	2011-2013	491,000	Cassava
10	Bio-energy and food security in ASEAN	2012-2014	488,000	
11	TCP Facility (ASEAN+)	2012-2013	202,364	
12	Strengthening Capacity for Regional Coordination & Monitoring of the Implementation of ASEAN Integrated Food Security Framework & the Strategic Plan of Action on Food Security	2013-2015	0	
(2) Other Trust Fund				
13	Sustainable Management of the Bay of Bengal Large Marine Ecosystem (BOBLME) - FULL SIZE PROJECT	2009-2014	12,082,107	Fishery
14	Production of Certified Fruit and Vegetables for Export from Lao PDR & Myanmar through Integrated Supply Chain Management	2009-2013	1,664,867	Fruits & Vegetables
15	Smallholder Dairy Development in Bangladesh, Myanmar and Thailand (SDDP)	2011-2015	1,999,778	Dairy
16	Enhancement of food production and nutrition of vulnerable conflict-affected families in Kachin State, Myanmar	2013-2014	274,512	
17	Immediate Technical Assistance to Strengthen Emergency Preparedness for Highly Pathogenic Avian Influenza (HPAI)	2008-2013	2,329,000	Livestock
18	Improvement of regional capacities for the prevention, control and eradication of highly pathogenic and emerging diseases (HPED) including HPAI in ASEAN and SAARC countries	2009-2015	10,939,608	Livestock
(3) Trust Fund/FAO-Government Cooperative Programme (TF/GCP)				
19	Intra-African Training and Dissemination of Technical know-how for Sustainable Agriculture and Rural Development with Africa-ASEAN Country Cooperation within the Framework of	2007-2013	6,293,651	Agriculture

	Project Name	Duration	Budget (US$)	Remarks
	South-south Cooperation			
20	Sustainable small-scale fisheries and aquaculture livelihoods in coastal mangrove ecosystems.	2009-2014	1,750,000	Fishery
21	Support to Special Rice Production	2009-2014	1,950,000	Rice
22	Immediate Rehabilitation of Farming, Coastal Fisheries and Aquaculture Livelihoods in the Cyclone Nargis Affected Areas	2009-2013	3,025,956	Fishery
23	Sustainable cropland and forest management in priority agro-ecosystems of Myanmar (PPG)	2013-2014	120,000	Forestry
24	Medium-term cooperation Program with Farmers' Organizations in Asia and the Pacific Region	2009-2012	1,083,000	
25	Support to Capacity Building and Implementation of International Food Safety Standards in ASEAN Countries	2011-2016	2,297,075	Foods Safety
26	Enhancing Understanding and implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture in Asia	2012-2015	435,000	
27	Support to Capacity Development in Implementation of Plant Pest Surveillance and Information Management in Southeast Asian Countries	2013-2016	1,796,642	Pest Control

Source: FAO: https://extranet.fao.org/fpmis/FPMISReportServlet.jsp?div=&type=countryprofileopen&language=EN&countryId=MM

5.4 World Food Programme (WFP)

WFP support community infrastructure development in rural areas through Asset Creation Program. Objective of the program is to mitigate natural disasters, improve access to market, and diversification of income source, and target areas are Shan State, Kachin State, Chin State, Magway Region and Rakhine State. Main activities of the program includes water resources development such as dam and pond, road and bridges construction to improve accessibility of rural villages, land development such as soil conservation and irrigation, and environmental management to retain soil water and reduce flood risk. Partners of the program are ADRA, ACRD, CARD, CARE and FAO. Outline of the Asset Creation Program is shown in table below.

Table 5-5 Outline of Asset Creation Programme (2010-12)

.	Activities	Unit	Output	Villages
1	Farm land development / terracing	ha	3,168	583
2	Soil conservation	ha	3,753	137
3	Irrigation canal	Km	596	234
4	Mini earth dam	No.	47	48
5	Embankment renovation	Km	183	80
6	Tea plantation	ha	331	91
7	Fruit Tree Plantation	ha	342	54
8	Nursery	No.	15	22
9	Tree plantation/ community forestry	ha	3,701	246
10	Fish pond construction	No.	137	56
11	Road construction/renovation	Km	1,737	629
12	Small bridge & culvert construction	No.	43	21
13	Dyke & weir renovation	No.	6	13
14	Jetty construction	No.	9	9
15	School renovation/construction	No.	21	21

.	Activities	Unit	Output	Villages
16	Clinic renovation/construction	No.	19	2
17	Erosion control/ retaining wall	No.	206	205
18	Pond construction/renovation	No.	65	63
19	Gravity flow water supply	No.	965	54
20	Rain water collection tank & others	No.	33	13
21	Well construction/renovation	No.	7,625	221
22	School water supply and warehouse construction	No.	20	688

Source: WFP

5.5 The World Bank (WB)

The World Bank, having provided various supports in agricultural sector to Myanmar in the past, is currently in the stage of resuming sport. According to its home-page, past trend of loan granted to Myanmar Government shows zero during the period of 2009 - 12 but in 2013 the Bank resumed loan to Myanmar amounting to US$ 520 million. Reengagement and Reform Support Program、National Community Driven Development Project etc are currently on-going. Also, according to ID, plural irrigation projects are currently put under examination.

Table 5-6 List of Projects Currently under Examination

Project Name	Status	Project Cost
Thaphanseik (Right canal) Irrigation Network New Construction Project	Proposed	US$14.45million
Kingtal Weir Irrigation Network Rehabilitation Project	Proposed	US$22.0million
Kinda Left-Canal (TadaU) Irrigation System Rehabilitation Project	Proposed	US$5.10million
Sedawgyi Irrigation System Rehabilitation Project	Proposed	US$17.57million
Megali Irrigation System Rehabilitation Project	Proposed	US$9.95million
Linzin Irrigation System Rehabilitation Project	Proposed	US$6.96million
Kabo Weir (Shwebo) Irrigation System Rehabilitation Project	Proposed	US$6.57million
Kindat Weir (Left/ Right) Irrigation System Rehabilitation Project	Proposed	US$21.17million

Source: ID, MOAI（2013）

In this regard, past agriculture-related projects by WB implemented during 1970s - 1990s included provision of irrigation facilities, grain storing warehouses, seed production, natural rubber production, farmland development, livestock development etc.

Table 5-7 Past agriculture-related projects by the WB

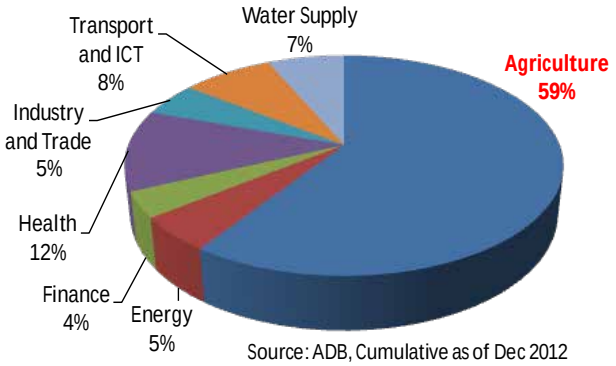
Project Name	Approved Date	Closing Date	Project Cost
YE-U Irrigation Rehabilitation and Modernation Project	Aug 26, 1986	Dec 31, 1993	US$ 14.00 million
Grain Storage Project (1) and (2)	Jan 6, 1981 May 29, 1986	Sep 30, 1986 Jun 30, 1995	US$ 23.00 million US$ 30.00 million
Seed Development Project	Jun 20, 1985	Jun 30, 1994	US$ 14.50 million
Rubber Rehabilitation Project	Jun 14, 1983	Mar 31, 1993	US$ 9.00 million
Myanmar Tank Irrigation Project	Dec 21, 1982	Jun 30, 1990	US$ 19.00 million
Nyaunggyat Dam Multipurpose Project	May 29, 1980	Mar 31, 1991	US$ 90.00 million
Lower Burma Paddy land Development Project (1) and (2)	Jun 15, 1976 Jul 6, 1978	Jun 30, 1985 April 30, 1990	US$ 30.00 million US$ 34.50 million
Seed Development Project	Nov 1, 1977	Dec 31, 1984	US$ 5.50 million
Livestock Development Project	Dec 23, 1975	Dec 31, 1984	US$ 7.50 million
Irrigation Project	Jun 13, 1974	Apr 30, 1981	US$ 17.00 million

Source: http://www.worldbank.org/en/country/myanmar/projects/all

5.6 Asian Development Bank (ABD)

ADB start again its development assistance from the beginning of 2012, after 25 years' absence. ADB ranked Myanmar as the country with remarkable economic growth among South-East Asian countries in its study carried out in 2012, it has an outlook of per capita income of Myanmar achieving three-fold increase by 2030.[47] In the light of such a prospect of economic growth, it provided more office staff in Myanmar office since August 2012 to strengthen function of the office.

Figure 5-1 ADB Loan to Myanmar by Sector



Source: ADB, Cumulative as of Dec 2012

According to home-page of ADB, cumulative amount of assistance by December 2012 reaches US$ 530 million of which 59% has been oriented to the support for agricultural sector. At present, ADB's priority areas for assistance includes a) analysis of macro economy, b) preliminary assessment for transportation, energy, agriculture, environment and natural resources, c) technical and vocational education after primary education, d) urban development including water supply and public health. Also, technical assistance (TA) for policy reform and administrative capacity enhancement is also started.

As a principle, ADB plans to deploy its axis of assistance, attaching importance to nurturing and developing organizations and human resources including Government staff, consolidation of business environment, strengthening network that connects rural villages with urban areas/ markets. Also, according to the said home-page, among the projects approved during the period 2012 - 2013, those that directly targeted to provide support to agricultural sector are not included, but many ones with multi-sector approach are found, in which support to capacity development predominates such as assistance for project plan formulation, business environment consolidation, assessment-management of road system etc. Besides, ADB plans to provide non-reimbursable assistance as the projects at the stage of proposition, in such forms as "Enhancing Rural Livelihoods and Incomes" and "Pro-Poor Community Infrastructure and Basic Services".

5.7 International Fund for Agricultural Development (IFAD)

IFAD implements rural development project which include agriculture and livestock development in Magway region, as well as supporting private investment on advanced technologies and processing plant aiming at export of agricultural products including rice.48 Also, it is reported on May 2013 that IFAD has a plan to implement low-interest loan program for agriculture mechanization, and the amount will be 36 million US$.49 Agriculture related program/ project if IFAD which are shown in its web-site are as follows.

[47] http://www.adb.org/countries/myanmar/main
[48] http://consult-myanmar.com/2013/10/11/myanmar-sees-encouraging-foreign-engagement-in-agricultural-sector-2/
[49] http://news.xinhuanet.com/english/world/2013-05/10/c_132372349.htm

Table 5-8 Agriculture Related Program and Project of IFAD

Project Title	Countries
CURE: Enabling Poor Rice Farmers to improve Livelihoods and Overcome Poverty in South and South-East Asia through the Consortium for Unfavourable Rice Environments (IRRI-1108)	Bangladesh, Burma (Myanmar), Cambodia, India, Indonesia, Laos, Nepal, Philippines, Thailand, Vietnam
Medium-Term Cooperation Programme (MTCP-FAO/SEWA)	Burma (Myanmar), Cambodia, China, India, Indonesia, Laos, Nepal, Philippines, Sri Lanka, Vietnam
Programme for Enhancing Agricultural Competitiveness of Rural Households in Greater Mekong Sub-Region (FAO-902)	Burma (Myanmar), Cambodia, China, Laos, Thailand, Vietnam
Programme for Improving Livelihoods and Overcoming Poverty in the Drought-Prone Lowlands of South East Asia (IRRI-1227)	Burma (Myanmar), Cambodia, Indonesia, Philippines, Thailand

Source: IFAD Web-site

5.8 Japan International Cooperation Agency (JICA)

The following table indicates list of on-going or scheduled agricultural sector-related projects and studies by JICA

Table 5-9 Outline of Agriculture-related Projects/ Surveys by JICA (as of May 2013)

	Project/ Study	Duration
(1) Yen Loan Project		
1	The Irrigation Development Project in Western Bago Region	A preparatory study for cooperation is initiated from March 2013
2	Two-Step Loan Project for Small- and Medium-Sized Enterprises Development and Agriculture and Rural Development (Proposed)	A preparatory study for cooperation is initiated in 2013
(2) Grant Aid Project		
3	The Project for Improvement of Machinery for Rehabilitation of Polder Embankment in Ayeyarwady Delta (on-going)	Cleared cabinet meeting in March 2012, E/N closed in July 2012, then closed G/A in October 2012
4	Food Aid to Poverty Area including Ethnic Group Area through WFP (on-going)	Cleared cabinet meeting in March 2012, E/N closed in April 2012, followed by G/A in May 2012
5	The Project for Improvement of Equipment for Human Resource Development in Agriculture (Proposed)	Cleared cabinet meeting in February, closed E/N in March 2012, signed G/A in May 2013
6	The Project for Underprivileged Farmers (2KR) (Proposed)	Cleared cabinet meeting and EN was closed in December 2012, signed G/A in May 2013
7	The Project for Mangrove Rehabilitation Plan for Enhancement of Disaster Prevention in Ayeyarwady Delta (on-going)	Cleared cabinet meeting in March 2012, E/N closed in April 2012, signed G/A in August 2012
(3) Technical Cooperation Project		
8	Small-scale Aquaculture Extension for Promotion of Livelihood of Rural Communities in Myanmar Project (on-going)	Project period: June 2009 - June2013 (Initially 3 years, later extended by one year)
9	Development of Participatory Multiplication and Distribution System for Quality Rice Seeds (on-going)	Project period: August 2011 - August 2016
10	Survey on Assistance for Economic Development (on- going)	Project period: October 2012 - March 2015
11	Project for development of water saving agriculture technology in Central Dry Zone (proposed)	Project period: June 2013 - June 2018

	Project/ Study	Duration
12	Project for Eradication of Opium Poppy Cultivation and Rural Development in Northern part of Shan State (proposed)	Project period: July 2013 - July 2018
13	Project for Small-scale Aquaculture Extension for Promotion of Livelihood of Rural Communities in Central Dry Zone (proposed)	Project period: October 2013 - October 2018
14	Adviser on Livestock Development in Central Dry Zone (on-going)	Project period: February 2013 - February 2015
15	Adviser on Agricultural and Rural Development (proposed)	Project period: June 2013 - June 2015
16	The Integrated Mangrove Rehabilitation and Management Project through Community Participation in the Ayeyarwady Delta (completed)	Project period: April 2007 - March 2013 (Initially 5 years, later extended by one year)
(4) Data Collection Survey		
17	Data Collection Survey of Agricultural Sector (on-going)	Project period: April 2013 - December 2013
18	Data Collection Survey on the Project for Development of Water Saving Agricultural Technology in the Central Dry Zone (completed)	Project period: March 2013 - September 2013
(5) Grass-rout Partnership Project		
19	The JICA Partnership Program for Project for Self Development of Circulatory Symbiotic Society in Southern Shan State (on-going)	Project period: April 2012 - December 2015
20	Plant Inventory Development and Evaluation and Effective Utilization of Resource Plant including medicinal Orchid in Shan State	Project period: November 2013 - November 2016

Source: JICA Myanmar Office

5.9 U.S. Agency for International Development (USAID)

Aiming at achieving Millennium Development Goal, USAID supports health, food security, economic opportunity and livelihood improvement with counterparts in Myanmar. Among them, food security includes investment in agriculture and nutrition to mitigate starvation and poverty, in collaboration with Myanmar government, development partners, people's organizations, private sector and other stakeholders.

Also USAID participates in LIFT and manage its program together with other donors to contribute mitigation of starvation and poverty. To stabilize food supply and income increase of 2 million small farmers, USAID supports increase in agriculture production, improvement of post-harvest technologies, acquisition of agricultural inputs, improvement of access to markets, livelihood support and sustainable natural resources management, capacity development, strict monitoring and assessment.

For food security and diagnosis of agriculture, USAID support enhancement of relationship between public and private sector, conduct capacity enhancement of them, and establishment and expansion of knowledge-base for long-term national food security. For this purpose, USAID conducts assessment to tackle issues on alleviation of starvation and poverty in collaboration with Michigan University and Myanmar Development Resources Institute. Planned activities of USAID in agricultural sector are as follows.

Table 5-10 Outline of USAID's Activities (as of October 2013)

Activity	Details
Supporting Land Management Policy	In collaboration with Ministry of Environmental Conservation and Forestry (MOECF), support land management policy from April2014. To utilize land resource more effectively, EU implement mapping, Switzerland support mapping and USAID conduct training.
Rice-Fish-Combination Farming in Delta Areas for Disaster Prevention Scheme	At present small farmers in Delta area increase their livelihood through mix culture of rice production and fish culture. By working with IRRI, support implementation of the mix culture as a part of countermeasures against natural calamities.
Value-Chain in Border Areas	Enhancement of value chain through improvement of transportation infrastructure at border area with dispatching expert more than 13 MM. USAID support policy analysis implemented by Myanmar Development Institute (MDI)

Source: USAID

5.10 Department for International Development (DFID)

DFID has supported LIFT program and DFID's total contribution to LIFT is £36 million from December 2009 to Dec 2015, which is 33% of the total LIFT fund. The activities delivered by Agriculture are one of the main focused sectors of LIFT. LIFT has also provided a platform for enhanced policy engagement on agriculture, food security, and rural development.

DFID also supported £ 7.5 million to 4 micro finance institutions to provide micro finance services to rural poor since October 2012. The loans granted to the rural poor are mainly for livestock raising, horticulture and paddy farming.

5.11 Australian Centre for International Agricultural Research (ACIAR[50])

Since 2012, ACIAR initiated various research projects (on 5 sectors, namely rice, pulses, fisheries, livestock, technical extension) one after another whenever budget is allocated. Currently, it started only the researches on rice and fisheries, but later teams of researchers are to be dispatched to each of these five sectors. These researches have major targets of food security and livelihood improvement of small-scaled farm households, in the target areas of Central Dry Zone - Ayeyarwady Delta. The total project cost amounts to 12 million US$ source of which is AusAID, and the scheduled project period is 4 years. Myanmar's C/P of this project covering 3 sectored, rice, pulses and extension is DAR, while that of Fisheries and livestock is LBVD（Livestock Breeding and Veterinary Department）.

It plans to carry out research on pulses in Central Dry Zone, scheduling to deploy research development and extension activities in three dimensions, i.e., soil/ water quality/ crop, placing the base of research in Yezin Agricultural University, Magway Agricultural University etc, creating close coordination with universities, DAR and DOA. More concretely, training of such target persons as extension workers, students and farmers will be provided on the measurement of soil water retention capacity etc. Ten years ago, it was engaged in a research project on pulses in Central Dry Zone in which selection of drought resistant varieties of pulses was made, thus the project planned this time is so to speak resumption of the experienced project activities.

[50] http://aciar.gov.au/country/Myanmar

5.12 Korea International Cooperation Agency (KOICA)

5.12.1 Activities in Myanmar

The office of KOICA was established in 1991, to which 70 volunteers have so far been dispatched and 700 staff of Myanmar has so far been invited to Korea. The fiscal budget in 2011 amounted to 53 million US$. KOICA has developed its activities giving priority on the following four types of assistance:

a) Support on rural villages development (Saemaul Undong Program – New Village Movement),
b) Support on industrial development,
c) Support on economic and administrative governance
d) Support on human resources development.

In an on-going project, C/P of which is DOA, it constructs Postharvest Technology Training Centre in Mandalay. It plans to utilize this facility for training on post-harvest techniques (packaging, quality inspection etc) for the purpose of preserving quality of farm products (rice, fruits etc) so as to improve farmer's income level. The construction of the said center started in December 2012, and it's expected to complete in September 2013, and upon completion, it will become the first post-harvest techniques training facility in Myanmar. Similarly, a project in aquaculture fishery sector is scheduled to start from the year to come in Mandalay F/S of this fisheries project has already been completed. As regards the site where Semaul movement is deployed, the site selection is under way, and the movement will be launched in next year. The movement includes road construction and domestic water supply as means of consolidating rural living environment on one hand, its livelihood component includes agricultural and livestock activities on the other. According to KOICA, it has an experience of supporting microfinance system in Hlegu Township（Sakhangyi Village, Kyaukgadin Village and Khanaung Village）.

5.12.2 Postharvest Technology Training Centre (PTTC) Project

This project is called "The `Project for Post-Harvest Technology Assistance for Myanmar Agricultural Products" under which it currently provides DOA for C/P with the scheduled period of 3 years from September 2011. This center is located at Htone-BO-Farm（the area for this facility: 80 ha）of DOA in Patheingyi TS, Mandalay Region, where mango, longan, pomelo, dragon fruits etc has so far been planted. It schedules to deploy training activities on post-harvest treatment after constructing a training facility in this farm.

Figure 5-2 PTTC

Total cost of this project amounts to 3.5 million US$, with the main objective of nurturing human resources to be engaged in improvement in productivity of perishable products so as to enable income level of farm-households and economic growth. KOICA envisages farmers and their organizations, export agents of perishable commodities, researchers and students in universities and research organizations and staff of DOA as the target of this training. Currently, the project is still at the stage

of constructing training facility that is to be completed within this year. As target crop commodities, it plans to deal with such tree fruits as mango, vegetables, flowers and rice.

As to the contents of this project, they consist of construction of training building (in which workshop, training room, trainer's room, cafeteria) and dormitory (for use of trainees, guest house), procurement of equipment for training, provision/ development of training courses, dispatch of experts. As kinds of equipment for training, they include machines/ equipment for washing raw perishables, sorting/ selecting or grading, processing, weighing and packaging, preserving/ storage and carrying, and equipment for quality inspection.

The contents of training are composed of post-harvest treatment techniques, plant physiology, sorting/ grading, packaging and palletization, preserving/ control measures against pests at post-harvest stage, GAP, organic agriculture, agro-products processing etc. and KOICA schedules to adapt to the trainees' needs ranging from a single day course to regular course for a month.

5.13 German Society for International Cooperation (GIZ)

In response to the last general election in November 2010, following the start of civilian political power by U Thein Sein in March 2011, EU decided to lift the sanction imposed to Myanmar, and German Government followed this decision and resumed its aid to Myanmar after 20 years blank period. GIZ currently deploys projects for 1) Private Sector Development, 2) Financial Sector Development and 3) Technical and Vocational Education and Training.

GIZ is carrying out a project called "Capacity Strengthening for Private Sector Development in Myanmar" with ministry of industry as a component of Private Sector Development, since April 2013. After establishing head-quarter project office in this ministry in Yangon, it opened another office in Taunggyi in June 2013. This project is scheduled for 33 months with the project budget amounting to EUR 4,500,000.

Table 5-8 Outline of Agriculture- related Projects by GIZ

Project Title	Implementing Partner	Duration	Budget
Capacity Strengthening for Private Sector Development in Myanmar	Ministry of Industry	33months	EUR 4.5 million
Financial Sector Development in Myanmar	Central Bank of Myanmar	36 months	EUR 3 million
Technical and Vocational Education and Training (TVET) in Myanmar	Ministry of Industry	36 months	EUR 5 million

Source: GIZ

According to GIZ, this project is concentrated on the support of small and medium scale enterprises (SME) in Myanmar, tackling with Capacity Development of stake-holders. Value Chain Approach has been employed in this project, in which two commodities, ice., tea and mango were selected as targets among 15 agro-commodities based on five selection criteria (export potential, value adding possibility, number of SME, market demand and income improving possibility). For both of two commodities, the base site of strengthening value chain is located at Taunggyi, in southern part of Shan State.

This project has been planned to specify the stakeholders to be involved, to hold regular Cluster Meetings, to consort/ consult issues and measures to be taken, support for formulating business plans

and to promote problem-solution oriented challenges, without provision of any financial aid but attaching importance to facilitation of strengthening value chain. Since perishable exports without processing have been current main stream, the project at this stage aims at strengthening packaging for export commodities. GIZ considers, provided that desire of processing the products is hereafter expressed from stakeholders in this Value Chain, it possible to address toward the support for processing. In such a case, though there remains possibility of collaborating with such fund-aid schemes as KFW, provision of machinery/ equipment for individual member is not possible under the current assistance principles, thus such conditions as joint holding of provided machinery/ equipment at village level is inevitable in this project.

5.14 Embassy of India

Indian government regards human resource development as priority area for its development assistance. For agriculture sector, Indian government has invited 20 daily farmers and government officials to provide practical training, as a part of human resource development activities. Also, the government has a plan to support research and development activities particularly on bio-product of rice, through establishing Rice-Bio-Park, a comprehensive model from seed to post-harvest, in collaboration with DAP in MOAI, and Yezin Agricultural University. In 2014, Indian government support establishment of Advanced Center of Agricultural Research and Education (ACARE) to transfer advanced technologies to scientists in the agriculture sector in Myanmar.

5.15 Non-government Organizations (NGOs)

Activities by NGOs in agricultural sector are briefed as follows. Though majority of NGOs provide activities related to food security and livelihood improvement, some other organizations offer activities for improving agricultural productivity, consolidating irrigation infrastructure, provision of micro-credits etc. In this concern, since information materials referred to in this Study give the state as of 2012, some examples of activities listed in the following table may already have been phased out as of August 2013.

Table 5-12 Outline of agriculture- related projects by NGOs

	Name of NGO	Program/ Project/ Activities	Duration
1	International Volunteers Service Association (AVSI)	Improvement of Food Security and Sustainable Agriculture Development Project (quality seed multiplication, promotion of low-input and organic based technologies, increase of irrigation water, provision of farm machinery and equipments, rehabilitation and construction of tube well, soil conservation, capacity building, etc.)	3 years (2010-2012)
2	PACT	Microfinance Program（MFP）	1997-on going
3	Action Aid Myanmar	Improve the Livelihood and Food Security of the Rural Communities in Central Dry Zone and Delta Areas	3 years
4	Korea Rural Community Cooperation (KRC)	"Project for Improving Good Agricultural Practice on Rice, Vegetable and Fruit Crops, and Income by Integrated Agricultural Farming in Myanmar"	2 years
5	Consortium of Dutch NGOs (CDN)	Program of integrated post disastrous resettlement food security and community develop project	3 years 6.3.2009 (1st) (3) Years (6.3.2009 to5.3.2012)
6	International Development Enterprises- Proximity Designs (IDE - Proximity	To improve the Livelihoods of Small Farmer Households in Rural Areas (treble pumps and drip irrigation, low-cost water storage, etc.)	3 years 13-1-2011 to 12-1-2014

	Name of NGO	Program/ Project/ Activities	Duration
	Designs)		
7	Organizational for Industrial, Spiritual and Cultural Advancements (OISCA)	Agro- Forestry Training Centre Project (Technical transfer, microcredit, construction of irrigation system, establishment of rice mill, construction of community infrastructure (round, community pond), construction of water supply system and sanitary improvement)	January 1996 to January 2015
8	World Vision Myanmar (WVM)	Rural Community Based Agricultural Capacity Building and Development Program	3 years 13-1-2010 to 13-1-2013
9	Action Contre la Faim (ACF)	Food Security, income generation (food production, rice intensification, rice banks, vocational training, agricultural training, Dam construction)	Since 1994 in Rakhine State, 2008 in Kayah State
10	Adventist Development & Relief Agency	Food Security (agriculture development, emergency food aid), Infrastructure, livelihood development, etc.	3 years
11	Agency for Technical Cooperation and Development (ACTED)	Livelihood and economic development, food security, etc.	Varying (since 2008)
12	CARE Myanmar	Food and livelihood security (agriculture, fisheries and livestock development, installation of irrigation system for increasing food production)	(since 1995)
13	CESVI Fondazione	Food security and livelihood security	5 years in Northern Shan and CDZ
14	GRET (Groupe de Recherche et d' Echanges Technologique)	Agricultural value chain development in the Ayeyawady Delta (developing the linkages among the agricultural products value chains, improving the productivities for rice cultivation, pulses, vegetables, flowers, livestock breeding and aquaculture development, financial service for farmers)	(since 2011 and 2012)
15	Norwegian People's Aid	Agriculture and rural development (capacity building, Cyclone response program)	Since 2009
16	Partners	Livelihood and micro-projects (pigs distribution and home gardening)	(since 1998)
17	Progetto Continenti (PC)-Myanmar	Livelihood & food security, micro finance, seed provision for small scale farmers, promotion of organic fertilizers, marketing of products, provision of agricultural tools, improvement of irrigation system, seed banks for rural development fund, etc.	2011-2012
18	Saeranar	Agriculture and social economic (microfinance, agriculture development, organic farming, etc.)	2007-2012
19	Solidarités International	Provision of buffalos, tillage tool sets, training on improved cultivation techniques, rat control campaign, setting up demonstration plot, construction of storm resistant storage facilities for paddy seeds	(since 2008)
20	Terre des Hommes Italia (TDH Italia)	Livelihood and agriculture development (construction and rehabilitation of wells, boreholes, water system and networks, ponds and dams for domestic and agricultural use, hydroponic water saving farming method)	2010-2011
21	Water, Research and training center (WRTC Myanmar)	Agricultural sector development (knowledge-based agriculture, irrigation, institutional capacity building)	(since 2003)
22	Welthungerhilfe	Integrated food security, agriculture, livelihood and income generation, etc.	Up to March 2013
23	World Concern Myanmar	Sustainable agriculture and livelihood development	3 years/ 1 year project
24	World Society for the Protection of Animals (WSPA)	Animal welfare (intensive farming, long distance transport and slaughter of animals for food), Community-based Early Warning System	Ongoing
25	Terra People Association (TPA)	JICA Partnership Program for Project for Self Development of Circulatory Symbiotic Society in Southern Shan State	Apr 13, 2012 - Apr 12, 2015

Source: Directory of International Non-Government Organizations in Myanmar 2012 (EU and LRC), and Website

CHAPTER 6 STRATEGIES FOR DEVELOPING RICE INDUSTRY AND PROMOTING RICE EXPORTS

6.1 State of Introducing, Breeding and Seed-Production of Paddy HYVs

(1) Introduction of HYVs

The system of approving new rice varieties in Myanmar is given below. According to DAR, promising varieties are first of all put under test cultivation in plural testing plots for 3 cropping seasons or 3 years. Later, new varieties are registered through test cultivation by farm households by Technical Seed Committee (TSC) and National Seed Committee (NSC).

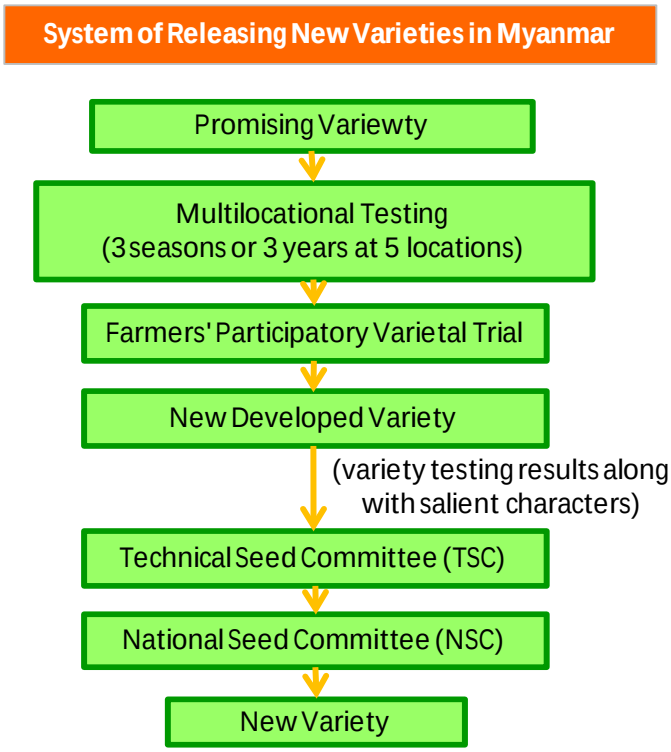


Figure 6-1 System of releasing New Varieties
Source: Seed Management System and Interectual Property Protection in Myanmar, Khin Mar Maw Nwe, DAR, MOAI

Introduction of hybrid rice is currently promoted in Myanmar by the initiative of Ministry of Agriculture and Irrigation. Above all, Palethwe Hybrid Paddy is well-known as "an early matured variety (100 days duration) with high yielding capacity and also with good taste" that appears every day on the screen of news media. According to MRF, seed of hybrid rice varieties is produced in the government-owned plots and its diffusion has been promoted through a seed multiplication system of the contracted cultivation in farmers' plots, but the seed price is expensive for farmers. Also, many farmers are reluctant to cultivate most Quality seed varieties that have inferior taste to traditional ones and some farmers worry higher future risk of pest damages due to their shorter growth period leading to poor tolerance

On the other hand, apart from hybrid rice recommended by ministry of agriculture and irrigation, Myanmar Farmers Association (MFA） selected the following 10 varieties of Quality Seed and advised their cultivation to the member farmers. In introducing such Qualified Seed (QS), member farmers are required to meet the following conditions; namely, 1) QS varieties are cultivated on at least 2ha, 2) Member farmer should cultivate them or manage them by himself/ herself, 3) The introduced farmers should follow the technical instruction for cultivating Qualified Rice、4) Produced seed should be sold only to neighbor farmers or MFA and 5) his/her cultivation of QS should serve for the advantage of/ support to Local Quality Seed Production Program.

Table 6-1　10 Varieties of Quality seed that MFA recommends

No.	Selected Rice Variety	Remark
1.	Hmawbi-2	Emata
2.	Sin Thwe Lat	
3.	Aye Yar Min	
4.	Thee Htut Yin	
5.	Yadanar Toe	
6.	Sin Thu Kha	
7.	Manaw Thu Kha	
8.	Kyaw Zay Ya	
9.	Shwe Wah Htun	
10.	Paw San	Mee Don

Source: MFA（2013）

(2)　State of Seed Production

Seed production has been promoted by PPP. Supply of recommendable seed has an established system comprising 1) Production of Breeder's Seed and Foundation Seed at the plots of DAR, 2) Production of Registered Seed in the seed producing plots of DOA, 3) Multiplication of Certified Seed at contracted farmers' plots, and 4) Purchase of thus produced Certified seed by DOA and its distribution among producer farmers.

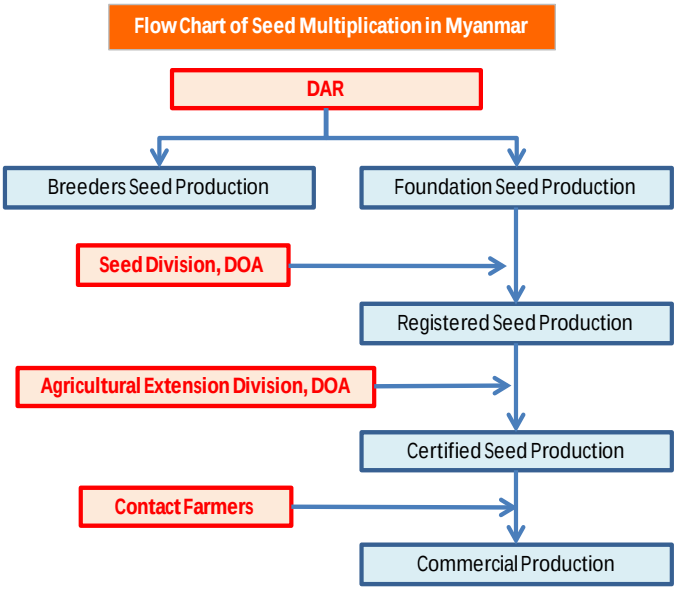


Figure 6-2 State of Seed Production

Source: Seed Management System and Interectual Property Protection in Myanmar, Khin Mar Maw Nwe, DAR, MOAI

However, the diffusion of quality seed has actually been stagnated due to the following reasons[51]:

a) Local varieties that match preference of general farmers and suit traditional way of farming, or varieties suitable for rain-fed paddy fields (deep-water rice, upland rice etc) are not included in Quality rice varieties,

b) Because cultivation techniques of contracted seed producer farmers are still immature, quality of Certified Seed produced by them is so poor that common seed producing farmers do not purchase it for the purpose of regeneration, but continue to use seed produced by themselves in their plots,

c) Seed producing farmers (both contracted and common) often fail to store produced quality seed until next sowing season, they sell it to rice millers as ordinary paddy, or self-consume for food, thus no seed is available for general farmers when they need it.

[51] JICA "Pre-evaluation table of "Project of Planning Establishment of Quality Seed Multiplication/ Extension System by the Farmer's Participation"（May 2000）

According to DOA, annual demand for Certified Seed is roughly estimated at 15 million basket[52] (6.1 million ha), but actually only about 30% of this requirement has been supplied. In this respect, Certified Seed has a merit that once farmers introduce it they can themselves harvest their seed for three years after the introduction. On the other hand, supply of hybrid rice seed has been supplied from government-owned farms and 4- 5 private enterprises. It is said that its demand is steadily rising, particularly it seems more utilized as Summer Paddy in Upper Myanmar.

In this connection, DAR is challenging production of quality seed with JICA's support by a technical cooperation under "Project of Planning Establishment of Quality Seed Multiplication/ Extension System by the Farmer's Participation". It plans to tackle its diffusion to farmers, and it also envisages exporting quality rice seed in future.

6.2 Rice Production Program Combining Water Users Association, Irrigation System and Farm Mechanization

In the speech of the President on 23rd February 2013, it was emphasized to accomplish agricultural revolution through the following means, namely, a) innovation of consciousness, b) improvement of farmland, c) utilization of quality varieties, d) application of better harvesting system, and e) farm mechanization.[53] As a practice of this revolution system, a pilot project of land consolidation for mechanized agriculture by power tillers and harvesters is being implemented on 3,000 acre (1,200 ha) of farmland in Nay Pyi Taw by the initiative of ministry of agriculture and irrigation

Besides, according to MOAI, it has established national policy of rice production in which each Department under MOAI sets its target according to which it provides support to farmers. More concretely, the support includes production/ sale of quality seed (by DOA and DAR), training/ extension to/ for farmers and extension staff (by DOA), research development (by DAR), construction/ rehabilitation of irrigation facilities (by ID and WRUD), implementation of land consolidation (by AMD), etc. According to numerical targets in the 5th Five-Year Plan indicated in National Comprehensive Development Plan, targets have been set as: rice yield; 81.5 baskets /acre (4.2t/ha) by 2015/16, rice production; 1,604 million basket (33.5 million ton) by the same year, self-sufficiency ratio of rice; 163% by the same year, irrigation area in paddy land; 5.8 million acre (2.3 million ha).

Table 6-2 Numerical Targets in Terms of Rice Production

Item	2005-06	2010-2011	2015-16
Yield	72.6 basket/acre (3.7 t/ha)	78.8 basket/acre (4.1 t/ha)	81.5 basket/acre (4.2 t/ha)
Production	1,325 million basket (27.7 million ton)	1,559 million basket (32.6 million ton)	1,604 million basket (33.5 million ton)
Self-sufficiency rate	152%	168%	163%
Irrigated area	5.28 million acre (2.14 million ha)	5.66 million acre (2.29 million ha)	5.80 million acre (2.35 million ha)

Source： Myanmar Agriculture at a Glance 2012, DAP-MOAI
National Comprehensive Development Plan (Agriculture Sector), MOAI
Myanmar Agriculture Statistics (1997-98 to 2009-10)

[52] equivalent to the input of 1 basket/acre over rice cropping area of 15 million acre
[53] http://www.president-office.gov.mm/en/briefing-room/news/2013/02/25/id-1619

6.3 Government Support Toward Rice Producing Farmers/ Enterprises

According to Myanmar Rice Federation (MRF), MOAI abolished government subsidy on fertilizers and seeds, but in place of subsidy it took measures of increasing level of fund by Agricultural Development Bank (MADB) from 20,000 kyat/acre to 100,000 kyat/acre (from 49,400kyat/ha to 247,100kyat/ha). However, estimation by MRF implies that at least 200,000 kyat/acre (494,200kyat/ha) is required for the cost of rice production, and also MADB estimates it at 250,000-300,000 Kyat/acre (617,700 to 741,300kyat/ha). It follows that fund provided by MADB fails to sufficiently meet the cost of rice producing farmers.

In addition, newly enacted agrarian act (March 2012) has allowed granting fund by holding a collateral on farmer's farmland as measures to expand fund supply to agricultural sector. As a result, other banks in addition to MADB can grant fund to farmers. Nevertheless, most banks except MADB has so far created branch-network targeting urban clients, and by this reason it is considered taking much time until they can actually provide fund for farmers

6.4 State of Rice Milling in Myanmar

The following table shows number of rice mills in Myanmar by size category. More than 15 thousand small-scaled (huller) rice mills with milling capacity less than 2 tons/ day are distributed in rural areas, while about 220 large-scaled rice mills with the capacity exceeding 40 tons/day have been identified. According to MRF, 99% of rice mills have already been privatized.

Table 6-3 Number of Rice Mills by Size

No.	Scale	Capacity	Number
1	Huller Rice Mill	Less than 2 tons/day	15,477
2	Medium Rice Mill	15 tons/day	1.220
3	Modern Rice Mill	More than 40 tons/day	224
4	Parboiled Rice Mill	-	6

Source: "Background Paper No.6, Rapid Value Chain Assessment; Structure and Dynamics of the Rice Value Chain in Myanmar", Larry C.Y. Wong and Eh Mywe Aye Wai, March 2013

Post-harvest losses of rice in South-East Asian countries are considered as 10 - 15% in terms of quantities loss by adding qualitative loss to it, the total loss amounts to 25 – 50%.[54] Particularly in Myanmar, 90% of rice mills including Huller face to quality problems, thus requiring modernization of rice milling techniques. According to MRF, milling loss reaching about 10% has taken place in middle-scaled rice mills, but some propel point out that many problems arise from harvested places to millers, especially problematic handling at paddy field level.

According to MRA, rice producing farmers harvested paddy is left on the harvested plot for 3 weeks - about one month after harvesting and this fosters occurrence of cracking over rice grains by the action of sunshine in daytime and moisture at night as major cause of broken rice. Also, insufficient drying leads to yellow coloring of rice grain and this discoloring leads to lower price offer by buyers. In recent years, climatic vagaries would result in rainfalls even in summer season, thus requiring to

[54] "Current status and issues on rice production and post-harvest losses in CLMV countries (1), Growth potential of Myanmar aiming at becoming a grand rice exporter" (P7), by Yuji Segosi and Mikio Yokoyama, "Emerging Markets Newsletter" (No. 24), Daiwa GRI, 2013

introduce combine harvesters and to install warehouses that enable rapid harvest and storage.

Table 6-4 Causes of Post-harvest Losses of Rice

Value Chain	Upstream	Midstream			Downstream	
	Production	Collection	Milling	Wholesaling	Retailing	Consumption
Stakeholders	Farmers	Collector	Miller	Wholesaler	Retailer	Consumer
Activities	Harvesting, threshing, Drying, Transporting	Collecting, Storing, Transporting	Milling, Storing Packing, Transporting	Storing, Trading, Transporting	Retailing, Transporting	Transporting, Processing
Post-harvest Loss	6 – 21%	2 – 6%	2 – 10%	-	-	-

Reference: Emerging Markets Newsletter, No.24, Daiwa Institute of Research, 2013

Similarly, according to an agricultural product inspecting company, SGS, the destination of Myanmar's rice exports is inevitably limited to African countries etc rather than to Asian market due to low level of milling techniques and resulted higher rate of broken grains. Original caustic factor of this quality deterioration may stem from poor cultivation management at paddy parcel level, resulting in intra-varietal crossing leading to higher rate of mixing with variable grain sizes (length).

Rice mills (it is said that around 30,000 mills exist all over the country) lack knowledge about international quality standard of rice, thus separate rice milling by grain size is not practiced. Under such poor conditions, unhooked grain inevitably remains mixing in the milled rice unless the adjustment of roller slit at rice milling to closer to short/ round grain, but long grain rice is easily broken by this adjustment, thus leading to higher rate of milling loss. Besides, at the delivery to Yangon, it is inevitable that rice grains of various shapes/ sizes are mixed, triggering another problem of quality control/ management.

6.5 Current Situation of Rice Marketing and Exports

(1) Marketing of rice

Regime of delivery/ distribution-quota introduced during the era of socialism had been out of function in 1987. Coping and concerted with this abolishment of old regime, the Government facilitated free marketing of farm products including rice, but later it resumed once-lifted regime in a limited way and it was 2003 that the regime was completely abolished. As to price control of rice, rice price had been controlled at very cheap level during the era socialism by the Government, however, since 1988, as the liberalization of private commercial activities was going on, rice pricing was gradually shifted to be determined basically through market mechanism.[55]

Rice marketing in Myanmar is divided into domestic trade and international one. The former constitutes transport-marketing from such rice-surplus areas as Bago Region and Ayeyarwady Region to rice-deficit ones including Chin State and Mandalay Region, the basic points of commodity flow are large cities including Yangon and Mandalay. On the other hand, the latter is export-oriented marketing with various marketing routes including such international ports of Yangon and Pathin, trans-border route to China via Muse, that to India via Myawady and that to Bangladesh via Maung Daw, etc.[56]

[55] "New light of Economy in Myanmar" by Akinosuke Odaka and Fumiharu Mieno, 2012, (P73 – 76)
[56] "Current status and issues on rice production and post-harvest losses in CLMV countries (1), Growth potential of

As a rule, plural dealers take part in rice marketing. In the case of rice for home consumption, farmers directly bring it to nearby Hullers etc, ask its milling bay paying milling fee, or they once sell it to dealers and later they repurchase it from them. As to surplus rice for sale, farmers often sell it to Collectors soar Middlemen in VT or TS and these buyers are apt to mill their purchased rice in nearby medium - large scale mills. Milled rice is sold to middlemen in local cities then it is traded in Rice Exchange Center in Yangon etc, and finally it is sold to wholesalers in consuming areas and to exporters. In this regard, supply chain of rice is schematically shown in Chapter 4, 4-10 Post- harvest treatment/ processing.

In Myanmar, grade standardization of domestically produced rice is performed by each of the following varieties: a) Ngasein, b) Emata, c) Zeera, d) Paw San or NgaKywe, and e) Kyauknyin. Ngasein variety gives hard, glutinous boiled rice and stays in stomach for longer time, thus suitable for meal of laborers, and it is also used to process into rice noodles. Emata variety is only export-oriented because it doesn't meet preference of Myanmar population. Paw San and NgaKywe are strongly sticky, with long grain and good flavor, thus domestically much appreciated among consumers. Kyauknyin variety is used for processing into cake and sweets.

For each of these 5 varieties, grading criteria of the standardization have been set: a) Grain Composition, b) Paddy, c) Maximum Allowance of Mixture, d) Milling Degree (7 grades)、e) Moisture Content (14% max). Out of which, Milling Degree is classified into the following shown 7 grades; namely, Extra well milled, Well milled, Reasonably well milled, Ordinarily milled, Slightly low milling (SLM), Low milling (LM) and Under-milled.

Table 6-5　Rice Milling Standard in Myanmar

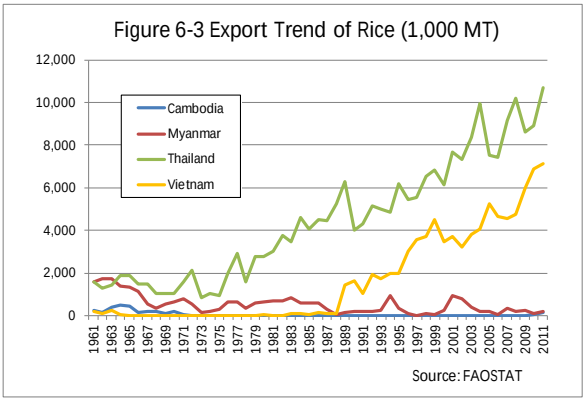
Milling Grade	Definition
Extra well milled	Paddy from which the husk, germ and the bran layers have been completely removed to the extent that appearance is translucent.
Well milled	Paddy from which the husk, the germ and the bran layers have been removed to a degree than that of extra well milled rice.
Reasonably well milled	Paddy from which the husk, the greater part of the gram and bottom of its outer and inner bran layers have been removed to a certain extent but in degree less than that of well milled rice.
Ordinarily milled	Paddy from which the husk and certain part of the gram and the whole part of its outer bran layers have been removed with some part of the inner bran layer remains intact.
Slightly low milling （SLM）	Degree of milling is about half way between the acceptable grade and the low milling.
Low milling （LM）	Degree of milling is about half way between the acceptable grade and the next lower grade.
Under-milled	Degree of milling is almost as low as the next lower grade of the acceptable grade.

Source: Standard Specifications for Myanmar Rice and Rice Products (MAPT)

According to SGS Company, it was found that about13% of low quality, easily broken rice called "chalky" was mixed in Hybrid rice in 2012. This "chalky" variety has high yielding capacity, but the problem id its poor quality. Thus, to make this variety export-worthy one further quality improvement is required.

Myanmar aiming at becoming a grand rice exporter" (P7), by Yuji Segosi and Mikio Yokoyama, "Emerging Markets Newsletter" (No. 24), Daiwa GRI, 2013

(2) Rice export



According to "Myanmar Agriculture at Glance 2012", export quantities of rice during the period of 2008-09 - 2011-12 have maintained the level ranging 530 - 820 thousand ton. On the other hand, referring to the statistics of FAO, annual export quantities during the same period gave the range between 120 to 250 thousand ton.

Although years with high level of rice exported reaching 1.7 million ton had been recorded during early 1960s, a declining trend of rice exports continues in the long run. Comparing with the growth of rice exports from Thailand and Viet Nam, an outstanding difference can be seen, thus it can be deduced that rice exports from Myanmar remains in an inactive state.

Rice policies by Myanmar Government attach the first priority to food security and nutritional improvement of the nation, thus striving for productivity and quality improvement for these purposes.[57] Upon satisfying these purposes, surplus rice is exported, thereby aiming at restitution as a rice exporting country. Exports of farm products have been placed as important means of foreign currency earning in National Comprehensive Development Plan (Agriculture Sector), but any target of rice exports is specified in it though quantitative target in terms of rice production support has been clarified therein.

Under such circumstances, policies of rice exports are reduced in the first place to expansion of rice production. As the policies directly related with rice exports, the Government has applied abolishment of export taxes on farm products, withdrawal of custom duties on such agricultural inputs as fertilizers and agricultural chemicals, liberalization of rice trade, facilitation/promotion of foreign investment etc. Since rice exports are a role to be played by private sector as a principle, the core of Government export promotion has been concentrated on the services that support private sectors activities.

On the other hand, Myanmar Rice Federation（MRF）has a target of expanding rice exports from 1.47 million ton in 2012/13 to 4.8 million ton in 2019/20. MRF plans to provide the following actions orienting to fulfilling the target, a) expansion of fund supply to farmers, b) promotion of group (joint) utilization centers of farm machinery. c) diffusion of Quality Seed, d) promotion of Farmer Extension Center project etc. Besides, MAPCO plans to create Integrated Rice & Food Processing Complex through a joint-venture with enterprises of Japanese origin, while it started rice exports to Japan in 2013. It is planned that Integrated Rice & Food Processing Complex has functions of rice (paddy) storage, rice milling, manufacture of vegetable oil utilizing rice bran, power generation utilizing rice husk, manufacture of processed foods like rice-noodle etc.

(3) Export prices of rice

In Myanmar, domestic market prices of rice are generally higher than export prices. Commonly, export

[57] http://myanmarricefederation.org/content/about-myanmar-rice-federation-mrf

prices should become higher level than domestic ones because of such additional costs as transport cost from producing areas, management costs at storage depot/warehouses etc, and minor cost for legal inspection and handling cost at the ports. However, a reverse phenomenon is observed. According to MRF, the reason of this phenomenon is attributed to rice varieties and quality. People in Myanmar have preference of taste to such varieties as Paw San Hmwe（or Paw San）and Nga Kywe etc, which are domestically traded at higher price levels, whereas rice varieties for export are Emata variety etc. Contrary to people of Thailand and Viet Nam who export higher quality rice and consume lower-grade one with high rate of broken rice, people in Myanmar used to domestically consume higher quality rice, with a tendency of exporting lower quality rice.

As a result, lower level of evaluation has been given to rice produced in Myanmar in the international market than that produced in Thailand etc. As evident from the above graphic data, the level of international price (on F.O.B. basis) given to rice produced in Myanmar has been only around 60 – 70% of that produced in Thailand. As a background of such a tendency, Fujita (2004)[58] points out that Thailand has mainly exported relatively better quality rice with the rate of broken rice at 5%, while Myanmar has exported lower quality rice with the rate of broken rice at 25% and also that Myanmar has weaker bargaining power in international market due to unstable and variable supply that leads to limited import clients.

In order to receive high evaluation in international market, it's important to produce proper varieties

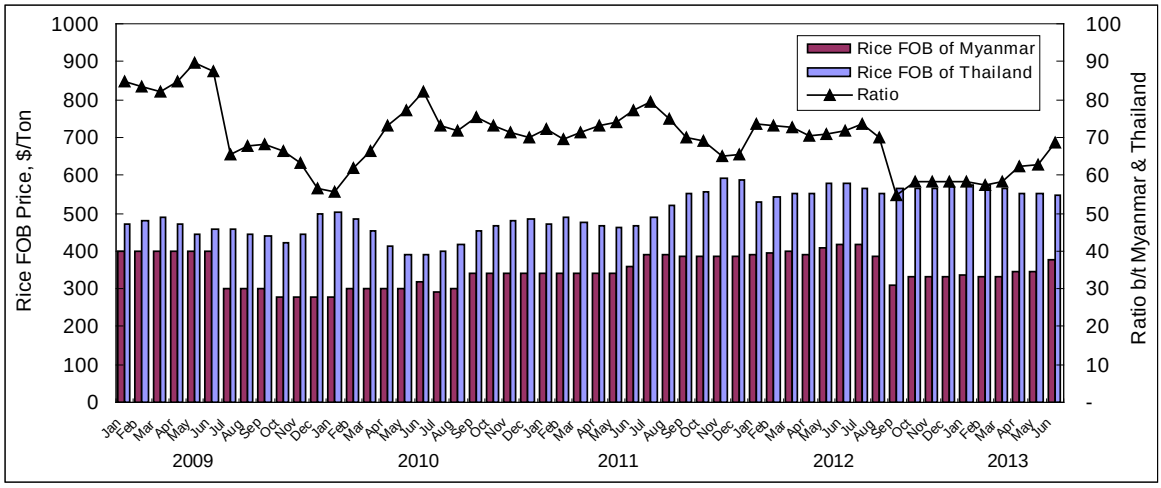


Figure 6-4　Comparison of Export Price of Rice from Myanmar and Thailand

the meet needs of international market, as well to make effort to improve quality of rice at marketing chain including milling. DOA recommends such export-oriented varieties as Nga Kywe, Paw San, Hangar, Mekaut, Aeemahta, Inmayebaw, Yebawlatt, Nantharmwe, Lonethwemwe etc. In this context, Export promotion Department of Ministry of Commerce is currently formulating National Export Strategy under the cooperation by International Trade Center (ITC). Among export commodities of Myanmar, rice is ranked at the top of priority crops, followed by pulses, fishery products, fiber based goods/ garments, sawn wood/ timber and natural rubber.

[58] "Chapter 3, Agriculture and rural development in Myanmar – mainly dealing with rice production sector –", 2012 by Koichi Fujita, "New light in Economy in Myanmar" by Akinosuke Odaka and Fumiharu Mieno, 2012, (P77-78）

CHAPTER 7 CURRENT STATUS OF FOREIGN PRIVATE ENTERPRISES INVESTMENTS

7.1 Current Status of Foreign Private Enterprises Investments

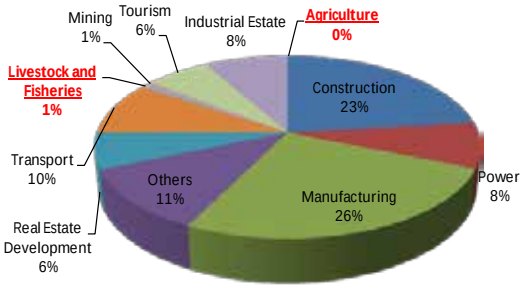


Figure 7-1 Domestic Investment (July 2013)

Source: Directorate of Investment and Company Administration (DICA)

According to Directorate of Investment and Company Administration (DICA) of MNPED, cumulative investment amount of 922 cases of enterprises of Myanmar nationality amounts to 3,069,700 million Kyat as of July 2013, out of which the investment amount to agricultural sector, 64 cases comes to 22,700 million Kyat, or 0.74% of the total invested amount. The breakdown of the investment to agricultural sector consists of 59 cases of livestock and fisheries sub-sector amounting to 22,100 million Kyat, followed by 5 cases of crop production sub-sector that received only 550 million Kyat of investment. The sector which received the heaviest investment is manufacturing sector (26% of the total amount) followed by construction sector (23%), other sectors (11%) and transport sector (10%).

Table 7-1 State of Investment to Enterprises of Myanmar Nationality (31/7/2013)

No.	Particulars	Permitted Enterprises		
		No.	Approved Amount (Kyat in Millions)	%
1	Construction	57	713,489	23.24
2	Power	7	246,233	8.02
3	Manufacturing	62	801,374	26.11
4	Others	27	343,839	11.20
5	Real Estate Development	34	195,082	6.35
6	Transport	22	292,127	9.52
7	Livestock and Fisheries	59	22,141	0.72
8	Mining	52	13,008	0.42
9	Hotel and Tourism	28	192,690	6.28
10	Industrial Estate	2	249,213	8.12
11	Agriculture	5	548	0.02
Total		584	42,950	100.00

Source: Directorate of Investment and Company Administration (DICA)[59]

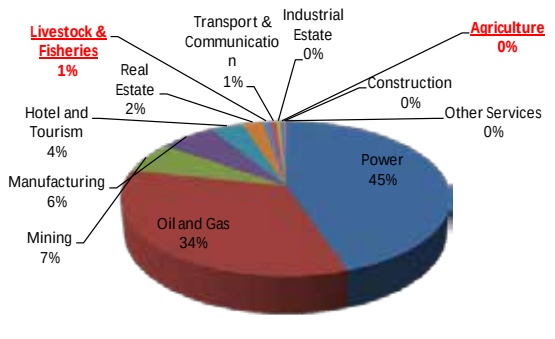


Figure 7-2 Foreign Investment (July 2013)

Source: Directorate of Investment and Company Administration (DICA)

On the other hand, cumulative cases of overseas investment are totaled at 584 cases with the invested amount to 43,000 million US$. Of which, investment to agricultural sector comes to 36 cases in total, with the cumulative investment amount is about 530 million US$, which accounts for only 1.2% of the total foreign investment amount. As to

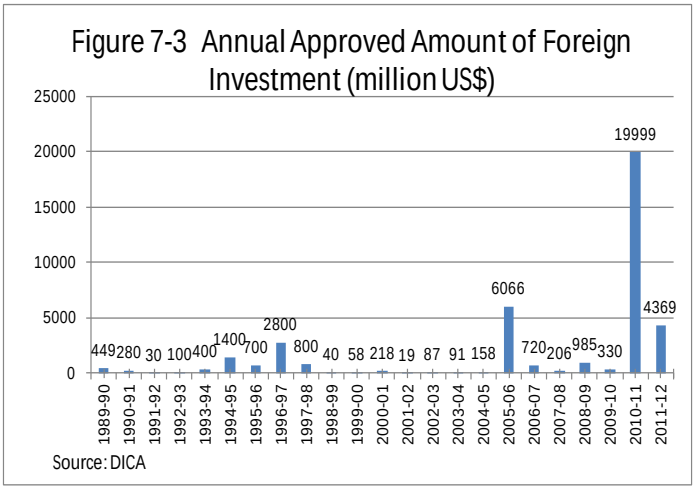
[59] http://www.dica.gov.mm/dicagraph2.htm

its breakdown, livestock and fisheries sub-sector has a share of 0.8% and crop production sub-sector accounts for 0.43%. As to overall share, 78% of the total investment amount is occupied by such energy sector as electricity (45%) and petroleum/ gas (34%) etc.

Table 7-2 State of Investment to Enterprises of Foreign Nationality (31/7/2013)

No.	Particulars	Permitted Enterprises		
		No.	Approved Amount (US$ in Millions)	%
1	Power	6	19,238	44.79
2	Oil and Gas	115	14,372	33.46
3	Mining	67	2,830	6.59
4	Manufacturing	261	2,750	6.40
5	Hotel and Tourism	47	1,586	3.69
6	Real Estate	19	1,056	2.46
7	Livestock & Fisheries	26	347	0.81
8	Transport & Communication	16	314	0.73
9	Industrial Estate	3	193	0.45
10	Agriculture	10	185	0.43
11	Construction	2	38	0.09
12	Other Services	12	42	0.10
Total		584	42,950	100.00

Source: Directorate of Investment and Company Administration (DICA)[60]



In Myanmar, privatization was rapidly progressed since the general election in November 2010 and the following start of political power headed by U Thein Sein in November 2011, and demand for foreign investments has been surged. In addition, The Foreign Investment Law was enacted in November 2012 leading to the gradual creation of improved and modern investment environment. According to the statistics of DICD, foreign investment had been made during two decades before the last general election at an annual rate of 760 million US$, but in 2010-11, direct foreign investment amounting 19,999 million US$ was brought in a single year.

As to breakdown of the foreign investment by country, China (including Hong Kong) accounts for 48% of the cumulative investment amount, followed by Thailand (23%), Korea (7%), England (7%), Singapore (6%), Malaysia (4%). As regards investment from Japan, its cumulative amount comes to 274 million US$, accounting for the share of 0.63%, with the country ranking of 11th among investing countries.

According to Myanmar Livestock Federation (MLF), private investment to livestock sub-sector has

[60] http://www.dica.gov.mm/dicagraph1.1.htm

been concentrated on feed production. Myanmar C.P. Livestock (capital originated from Thailand) and Myanmar JAPFA Maykha Co. Ltd. (capital originated from Indonesia) are considered as pioneers in this field where the former has become the largest supply-chain of poultry meat. In this connection, China (New Hope), Korea (Sunjin Myanmar) and Japan (Marubeni) etc are preparing investment to livestock sub-sector in Myanmar.

7.2 Some Cases of Private Enterprise Investment

7.2.1 Rice Production

(1) MAPCO

MAPCO was established as a Public Company in Myanmar under the instruction of Ministry of National Planning and Economic Development in August 2012. Currently, shareholders of this company counts more than 1,000 persons, with 52 company staff. Shareholders consist of individual and private enterprises but the Government is not included as shareholder.

The company deploys its activities concerning its major three-tier goals, namely, food security, business operation and sustainable development of markets utilizing the fund obtained through the sale of its stock. More concretely, it invests asset to agri-business including integration/ coordination of supply chains / value chain concentrated on rice. Its business includes construction/ management of rice-mill, production/ distribution of quality seed, distribution of fertilizers, rice cultivation on contracted basis, international trade of rice etc.

The company aims at prompting a) Integrated Rice & Food Processing Complex, b) Port & Grain Terminal Project (Thilawa), c) Hotels & Serviced Suite, d) Agro-commodity Trading etc, in its business plan in 2012/13, Integrated Rice & Food Processing Complex is a joint venture with Mitsui Bussan, which is now in preparatory stage. This Complex plans to be engaged in rice storage, rice milling, manufacture of oil utilizing rice bran, power generation utilizing rice husk, manufacture of such processed foods as rice-noodle. In addition, the company plans to construct Agribusiness Service Centers at 10 sites in Lower Myanmar from which tractors, harvesters, driers etc are leased to farmers.

(2) Contracted Rice Cultivation

According to DOA, contracted rice cultivation has not carried out between the Government and farmers, but realized by such private groups/ enterprises as MRF and MAPCO, or CSC (Crop Specializing Companies) who contract with farmers. According to MRF, it was not until 2008 that large scale rice cultivation on contract basis was initiated in rice production field. Other than rice, contract based crop cultivation has been introduced in the production of sugarcane, pulses, maize etc.

Contents of contract vary with related enterprises and also with crops, but in the usual case of rice, a) cases that enterprise side pays advance prior to cultivation, and farmers purchase seed, fertilizers etc using the advanced payment, b) cases that enterprise side provides farmers with such inputs as seed, fertilizers etc in kind, c) cases in which farmers receive not only inputs bur also fund service. According to a study by Myanmar Rice Industry Association (currently MRF)[61], as regards shares

[61] "Study of Socio-demographic Characteristics and Impact of Contract Farming on Rice Farmers' Performance in

among different contract forms between Rice Specialized Companies and farmers, cases in which farmers receive both managing/ running fund and fertilizers are the most popular (65%), followed by those with fund only accounts for 24%, cases in which farmers receive fund, fertilizers, machinery services and technical instruction has the share of 6% and cases of supplying fund, fertilizers and machinery service accounts for 5%, respectively. As to contents of contract, two types seem to exist, namely, they are explicitly described in contract document in some cases, but in other cases only barbell promise is exchanged based on long mutual trusteeship. According to DOA, in the cases accompanying with exchange of contract document, such occasions are observed in which signature is given by a group (of 5 farmers for example) under the witness of village leaders

Another example shows that an enterprise running rice mills in Bago West Region does not provide direct fund/ loans but supplies seed, agricultural chemicals, plowing and harvesting services by means of rental farm machinery and these costs are subtracted from product purchasing amount.

This enterprise also provides instructions on cultivation techniques for the purpose of product quality control. It is said that this enterprise offers a bit higher purchasing price as compared with prevailing price level in the area partly because of its bargaining power deriving from self-running of a rice mill. In this case, long-term trade relationship has been created between the rice-mill enterprise and local farmers, thus mutual trusteeship has already existed before starting contract cultivation. Such a premise will bring a merit to both farmer's side and the enterprise side.

Furthermore, in a case of a venture in Mandalay, it not only distributes fertilizers and seed to the contracted farmers, but it also provides fund amounting 100,000 Kyat /acre (247,100kyat/ha) per farmer if the farmer desire to receive. Every time the venture purchase such farm products as sesame, groundnut, maize, cotton etc from fund-granted farmer, it reduces amount of found repayment instead of paying price, and when the balance becomes zero, again fund is granted if the farmer desires to receive it again. Also, MAPCO purchases quality seed (of registered 15 - 20 rice varieties) from DOA and leases it to the contracted farmers along with fertilizers and fund and at the harvest, the farmers give back the received seed quantity from their harvests. As to cultivation of quality seed on contract basis, MAPCO contracts to receive all harvested amount (100%) of quality seed from its contracted producers.

In the case of rice, according to MRF, the purchasing unit price (contracted price) is generally agreed prior to the contracted cultivation, and the contract is renewed every year. This contracted unit price is commonly set lower level than wholesale price, and this price serves as a ground of advanced payment for the contracted cultivation. Costs of agricultural inputs and farm machinery services (plowing/ paddling/ harvesting) is to be subtracted from the purchased value based on the agreed purchasing price. Interest is imposed on the advanced payment and the interest amount is also subtracted from this value at the harvesting period. And the rest amount is received by the contracted farmer. Thus, such a transaction is considered rigorous for the side of farmers. Two methods of payment from farmer's side are considered, either in kind or in cash, but in the case of contracted cultivation, repayment in kind seems to be more often adopted.

Myanmar", Myanmar Rice Industry Association, April 2012（P36）

However, in other cases, there observed dealers who buy harvests at higher price, comparing market price level at the harvest period with the price base of advanced payment. Ayeyar Pathein paddy trading Co., Ltd. in Ayeyarwady Region that closes cultivation contract with 200 rice producing farmers offers compensation for the price difference in the case that the contracted price happens to be lower than market price, and in the opposite case that the contracted price is higher than the market price, it buys the harvest at market prices. As similar cases to this example could be heard in DOA, types of contract in which farmer's side can take advantage is considered not so rare.

According to MAPCO, there have been about 60 ventures that offer contracted rice cultivation, but in recent couple of years climatic vagaries have prevailed, resulting in many contracted farmers went into default. This eventually causes many of these contracted ventures are obliged to stop their business operations and as of 2013, it is reported that only about 3 ventures still continue their operation.

7.2.2 Production of Natural Rubber

Natural rubber has been produced almost all the regions/states in Myanmar except Central Dry Zone and north-western mountainous region, but among others southern states including border area with Thailand constitutes representative producing area as represented by Mon Sate, Tanintharyi Region, Kayin State, Bago Region etc.

According to Myanmar Rubber Planters & Producers Association (MRPPA), 97% of Nursery producing rubber tree seedlings are privately owned and only 3% of them are owned by Government. As to seed variety, RRIM24 and PB235 are utilized in southern area including Tanintharyi Region, while PR107 and RRIM (600) are planted in such northern area as Shan State. Varieties belonging to RRIM series are exploited by Rubber Research Institute of Malaysia, and Indonesia also utilizes this series of varieties.

85% of rubber producers fall into the category of small to medium scaled farmers who hold 8-20 ha of farmland, while about 100 enterprises run the plantation area of 405 ha or more. The recent rubber production in Myanmar is given in the table below.

Table 7-3 State of natural rubber production

Year	Planted Area (ha)	Productive Area (ha)	Production (MT)	Export (MT)
2005-06	226,051	108,128	64,238	52,800
2006-07	294,755	122,991	73,355	46,960
2007-08	378,718	138,784	88,528	61,610
2008-09	427,928	144,250	93,207	39,860
2009-10	462,745	166,610	111,673	78,000

Source: MRPPA

As to processing of natural rubber in Myanmar, two kinds of products have been produced, namely、RSS (Ribbed Smoke Sheet：smoked sheet rubber) and TSR (Technically Specified Rubber：technically graded rubber), but Concentrated Latex has not produced. RSS is produced and processed by almost all producers including cottage industry by small to medium sized producers, accounting for around 70% of natural rubber products in Myanmar. The rest 30% produce TSR, however, since capital investment is required for the production of TSR, only 14 companies among the producing members

are engaged in its production.

92% of the total quantity of Natural rubber produced in Myanmar has been exported and the rest 8% is domestically processed into tires, slippers and shoes etc. Major destinations of the exports include China, Malaysia, Singapore, Korea etc. Most quantities of exports are exported to China, however, it is difficult to hold an accurate figure of exports in the case of exports through border frontier. According to MRPPA, it is said that no foreign investment has been made, but some other information suggests that participation of outsiders by Chinese capitals is increasing along the territorial border with China.[62]

About 80% of the end-products of natural rubber are tires or tube. Two tires factories are located also in Myanmar. According to MRPPA, these end-products had originally been produced two factories owned by Number 2 Heavy Industry that was under the umbrella of Ministry of Industry, but at present it is said that these products are processed in Yangon Tire Factory under Myanmar Economic Corporation (MEC) owned by the military do Myanmar.

Markets of natural rubber[63] consist of spots market and futures one. Major producing countries of natural rubber include Thailand, Indonesia, Malaysia, India, China etc., while its price is greatly affected by the situation of automobile industry. For this reason, at present, price indices credibility of TOCOM (Tokyo Commodity Trading Center), a representative futures market of rubber has been very high, thus becoming price-leader of international rubber market. On the other hand, actual trade of natural rubber has mainly been transacted in Singapore the has been developed as an important relay point of natural rubber exports where SGX (Singapore Trading Center, transferred from SICOMS (Singapore Commodity Trading Center) in May 2011) is still now attached importance as a market in the producing area.

7.2.3 Sugarcane Production（Yuzana Group）

Major producing areas of sugarcane are distributed in the middle part of Myanmar, including Pyay, Mandalay, Pyinmana, Sagaing etc where majority of cane producers are small-scaled farmers with sugarcane cropping area ranging 1-2 ha/annum/farm. Area of sugarcane field procured by Yuzana Group is about 5,000acre (2,024ha), where the Group has established contract association with farmers, providing inputs like seed/ cuttings, fertilizers and services like tractors for plowing for rent, subtracting 300,000 kyat/acre (741,300kyat/ha) in king from their harvest. Out of the total repayment, it orifices 100,000 kyat/acre (247,100kyat/ha) free from interest but it imposes interest at the rate of 2%/ month on the rest 200,000 kyat/acre (492,200kyat/ha). In this association, sugarcane seed is purchased from MOAI and Sutech Engineering Co., Ltd. (SU-ENCO) in Thailand.

Farm-gate price equivalent to 300,000 kyat/acre (741,300kyat/ha) has been kept for these two years though it has been set at higher price level than that of international (sugar) price in Thailand. This price set by Yuzana Group does not include transport cost from cane field to sugar mills, but this cost is borne by Yuzana side.

Yuzana Group runs 2 sugar-mills and 1 alcohol distillery, but these 3 factories have been leased from

[62] Japan Myanmar Amity Interchange Association(NPO)（http://www.ajmmc.org/2011/06/rss1.html）
[63] Referring to HP of TOCOM（http://www.tocom.or.jp/jp/nyumon/textbook/rubber/rubber6.html）

the Government paying 450 million kyat/ year. Two sugar-mills located at Pyinmana have both been so dilapidated that one of them has been out of function and the other has been impossible to put into full operation.

18 sugar-mills have so far been established in Myanmar, out of which 17 are owned by the Government and the rest one is Nawade Sugar Mill constructed in Papy Township of Bago Region that has the capacity of 2,000 TCD (tons crushing in a day) run by a JV between Myanmar Sutech Co Ltd (Myanmar Sugarcane Enterprise) and Sutech Engineering Co., Ltd. & Associates (Thailand). According to Yuzana Group, all these Government-owned 17 sugar-mills have already been privatized and run by MEC (Myanmar Economic Corporation) and UMEHL (Union of Myanmar Economic Holdings Ltd.) etc. In this regard, as implied by the above-cited example of Yuzana Group, current real situation of privatization is considered as a form of Management Contract or Lease Contract in which proprietorship of mills remains at the Government side but management thereof is entrusted to private sector.

7.2.4 Palm oil Production[64]（Yuzana Group）

Myanmar is an importing country of palm oil, and its imports have been a scale of 80 million US$ per annum. Because fund is required for initial investment to palm plantation, major domestic planting has been confined to plantations and production has not been practiced by small scaled farmers. In Myanmar, plantations of 10,000 acre (24,710 ha) or so have been run by Yuzana Group, POKUNG (without oil extracting facility, selling product to Yuzana), South Dagon Palm Oil Plantation (running a CPO processing facility with the capacity of 25 - 30 t/hr), Dagon Timber (without oil-mill, selling product to Yuzana) etc.

Out of these, Yuzana Group is the largest producer/ processor of palm oil in Myanmar that started plantation management in 2000. It manages the business by vertically integrating the whole supply chain covering from the management of plantation and operation of oil extracting/ refining plant to marketing and sale. Oil-palm seed has been supplied by the imports of Hybrid Seed (GMO) from Malaysia and Costa Rica by paying 25$/Seed, and according to the Yuzana no problem arises from the domestic production cost of oil palm.

Yuzana Group has managed its plantation in southern Myanmar, Tanintharyi Region since 2000 where it employs 8,000 laborers to manage 160,000 acre (64,752 ha) of oil-palm area. Rainfall throughout the year is desirable for oil palm plantation, but in Tanintharyi Region two months of dry spell in a year exists with very limited rainfall. In 2012, 4 months of dry spell prevailed in this Region where such rain deficit climate takes place once in a decade, and weight of harvested FFB had lighter weight than that of average year and oil content was the problem, lower than that of ordinary year.

Since palm oil must be extracted from palm fruit within a specified time after its harvest (generally 24 hours as the indicator) from oil quality control point of view, the Group constructed 3 extraction plants of CPO and PKO in Tanintharyi Region, operating these plants at the capacity of 60t/hr, 60t/hr, and

[64] Palm oil is the oil extracted from fruit of oil palm trees. Raw fruit harvested from oil palm is called fresh fruit bunch; FFB; Oil extracted from flesh of palm fruit is called crude palm oil: CPO; while that extracted from seed kernel is called palm kernel oil: PKO. In general these two kinds of totally are called palm oil.

30t/hr, respectively. It constructed a Refinery Plant with the capacity of 300t/day in Yangon in 2005, thereby it produces / sells refined oil oriented to domestic markets.

7.2.5 Agricultural Inputs

(1) Imports/ Sale of Inputs (Myanmar Awba Group)

Myanmar Awba Group is an enterprise group that was established in 1995 mainly dealing with imports/ sale of agricultural inputs. Commodities handled by the enterprises under this group include fertilizers, agricultural chemicals, weedicides, seed, livestock-feeds, inputs of chemical products etc, and the member enterprises cover the entire supply chain of agricultural inputs, creating base points for sale network in various areas in this country. It has about 1,100 staff and 500 agricultural experts belong to the group.

Seed handled by the group is mainly hybrid seed of vegetable and fodder maize imported from Thailand, India and Japan. The group does not deal with rice seed and does not sell seed of pulses and oilseed crops because farmers tend to self-supply it from their farmland.

Imports and sale of agricultural chemicals had been put under Government control until 1995. Seizing the opportunity that private sector was allowed participating in the business of importing and selling agricultural chemicals in 1995, Myanmar Awba Group started to import / to sell such agricultural inputs as agricultural chemicals and seed. It imports agricultural chemicals mainly from India, China, Japan, EU etc.

Fertilizers had been put under the Government control until 2003, since 2003 when the control was lifted Myanmar Awba Group initiated sale of fertilizers. Among fertilizers, Nitrogen (N) and phosphorous (P) fertilizers are imported from China, and potassium (K) ones from Russia. Since rice price had long been placed at low level, rice producing farmers had tendency of being reluctant of using fertilizers and agricultural chemicals, but because of recent rising trend of rice price level triggered by privatization of rice marketing, number of rice producing farmers who began to use these inputs shows gradually increasing trend since last year or so.

In this context, Myanmar Awba Group has established its own and specific distribution network to develop sale of farm inputs. In selling them, the Group does not utilize existing Government created route. It has not only created its own “Distribution Centers” at 30 sites mainly at TS level, but also it has promoted sale in cooperation with over 500 local agents. Besides, it has been striving for diffusing utilization of farm inputs, by regularly inviting client farmers to study tours, thus providing training on effects of fertilizers and agricultural chemicals and their application methods.

(2) Problems related to Fertilizers/ Agricultural Chemicals

Inspections/ examinations of chemical fertilizers have been carried out in a laboratory of DOA in Yangon, through which those that can be applied have been officially registered. Besides, inspection teams have been organized at Regional and State levels in which fertilizers marketed to farm-input markets have mainly been inspected. These teams are consisted of staff of DOA (Land Use Division) and General Administration Department (GAD) and also police staff, which identify the state of registration on marketed chemical fertilizers. In the cases that they identified un-registered fertilizers

in these markets, warning publicity is made through such newspapers as New Light of Myanmar in such a way as “do not use the fertilizer sold in such and such shop”.

Although Plant Protection Division of DOA has established quarantine offices at Myanmar frontier, the inspection system of agricultural chemicals is not yet thoroughly functioning. Also, inspection of fertilizers is to be made by Land Use Division under DOA, but staff / organs are not yet deployed at the frontier. Lack of such inspection system has led to insufficient control of fertilizers importing from border countries including Thailand and China, thus fake commodities, fertilizers that contain less nutrient gradients than registration standards, merchandises for which their contents/ usage can hardly identified because they are labeled in Chinese letters. As a result, it has been reported that the occurrence of detrimental load to natural environment or of damages on human body such as dermal inflammation. In response to such reports of damages, DOA has acquired budget for measures in fiscal 2013-14, planning to dispatch inspection team(s) to the frontier for monitoring/surveillance.

In this context, according to MRA, marketing of low-quality or malignantly-fake fertilizers has not be confined to foreign made commodities but also it has been observed on domestically produced ones. In Fertilizer Act, it specifies kinds of gradients to be contained in fertilizer commodities all right, but no quantitative specification is explicitly prescribed therein. It has been made clear through a survey by MFA on the content of nutrient gradients that is usually at least 25% in other countries, but in Myanmar some sample contain about 1 - 2%. To officially control marketing of such low-quality or fake fertilizers, MFA proposes measure of a) strengthening inspective control at the frontier, b) strengthening storage management in warehouses, c) strengthening marketing management throughout supply chain, and d) strengthening self-management at MFA member farmers.

7.2.6 Feed Maize/ Concentrated Feeds (Myanmar C.P. Livestock[65])

Myanmar C.P. Livestock Company and C.P. Seeds Company are member enterprises of CP group under the umbrella of an international conglomerate that has its head company in Thailand, producing livestock feeds and hybrid seed, respectively. It was established in 1995, starting from maize production, currently running with about 400 staff. The CP group has become a largest supply chain in Myanmar dealing with such livestock products as poultry meat, hen’s eggs, pork etc running business through vertical integration of the entire supply chain covering from feeding of broiler chicken and pigs. Manufacture of sausage, fried chicken etc to retail sale at CP Fresh Mart.

(1) Production of Feed Maize

The whole cultivated area under maize crop as of 2012 in Myanmar was 412,000ha, and it is planned to expand it to 939,000ha by 2020 by promoting cropping as a second crop after rice in irrigated areas and also by reclaiming undeveloped land located in Chin State etc.

Maize is cropped in two seasons, and Shan State is major producing area of rainy season (harvested in September - October) which is followed by Bago, Magway, Nay Pyi Taw etc, while that of winter season (harvested in February - March) is distributed in the area along Ayerwadi River basin, Meiktila and Kyingyan etc. Maize produced in Shan accounts for 80% of the total domestic production of

[65] http://myanmarcp.com/

maize, but as far as quality is concerned, maize cropped during winter is superior because of less moisture content of grain. Yield of rainy season maize is 5 t/ha, and that of winter season is 6.2–6.7 t/ha, while farm-gate price levels are 280 Kyat/kg for rainy season maize and 245 Kyat/kg for winter season one.

The level of domestic maize production is 1.7 million ton per year, out of which 17% (equivalent to 0.29 million ton) is the shear of CP group. Out of the production amount, 0.8 million ton is exported that is larger than domestically consumed amount, and most imports is oriented to China.

(2) Production of Crop Seed

Major seed commodity produced by C.P. is hybrid maize seed called ”CP888 (F1) ” that belongs to a type of producing 2 cobs per seedling. The seed producing farmers select suitable variety among a few varieties owned by C.P. Seeds Company, thus closing production contract with the Company on condition that their seed products are 100% purchased by it. C.P. Seeds extends contract cultivation mainly in Shan State, while it also has its production base in Bago, Magway and Nay Pyi Taw. Number of contracted farmers on maize production contract is totaled at 2,049 households, the area of maize cultivation under the contract comes to 2,350ha and the value of contracted production amounts to 3,456.8 million kyat (equivalent to 123 million Baht).

Each contract farmers deliver the harvested seed directly to the processing factory (for sorting and selection/ packaging) by tractor etc within 3 - 4 hours after harvesting seed. This time limit of 3 - 4 hours has been imposed for the purpose of quality control, and if the delivery time takes longer than the limit such problems arise as the lowering of germination ratite. By this reason, the factory construction site is required to locate near the seed cultivation farm/ parcels. At the delivery, acceptance of delivered seed has been rigorously controlled by the system where the expertise inspectors check the delivered seed.

The seed factories are located at Thante and Aythaya where 260 employees are hired. In 2013, 4,630t of domestically oriented seed and 1,000t of seed for exports were produced. Major export destinations are China, Viet Nam, Cambodia and Laos. Sale of seed is mainly made through agents.

(3) Feed production

Feeds are manufactured targeting chicken, pigs, goats, cows/cattle etc. Feed manufacturing factories are located in 4 sites, namely Yangon (production capacity is 40t/day), Mandalay (ditto 200t/ day), Taunggyi (ditto 200t/ day) and Kyaukme (ditto 150t/ day). Feeds are processed with yellow corn and other blending materials, in which the mixing rate of yellow corn has the upper limit of 60%, to which rice, fishmeal, soybean etc are blended. The target areas of sale include Northern States of Myanmar, Mandalay State, Shan State etc.

7.3 Positive and Negative Impacts of Investment of Private Sector Enterprises to Farm Households

7.3.1 Positive Impacts

One of the merits brought about by the participation of private enterprises lies in increased stability of

crop production through the system of contracted production. In the case of Myanmar where crop producers has small scale farming with poor capital provision and also rural fund supply is in underdeveloped state, farmers becomes possible to timely procure such farming inputs as seed and fertilizers by engaging in contracted cultivation in cooperation with the invested capital. Besides, because the enterprise side never fails to purchase the farm products under contract, they can save labor for selling them, thus enabling to stabilize their income.

On the other hand, the enterprises are possible to realize scale-merit through the system of contracted cultivation, and they can also dissipate risk on the production. In addition, as compared with the cases that they procure processing materials in markets, contracted crop production gives the advantage of easier quality control. As a reference, general merits obtained from contract cultivation are tabulated below:

Table 7-4 Advantages of contracted cultivation

Advantages for enterprised	Advantages for farmers
ü Realization of scale-merit	ü Procurement of farm inputs
ü Share of risks	ü Easier access to fund/credit
ü Unification of quality	ü Guarantee for purchasing contracted products
ü Saving of production cost including labor	ü Stabilization of income
ü Flexibility of production quantity control	ü Better access to markets
ü Promoted sale of production inputs	ü Utilization of by-products, residues, extra-standard products etc
ü Possibility of getting financial assistance and government assistnce	ü Introduction of appropriate farming techniques
ü Evasion from land problems	ü Transfer of farming techniques

Source: "The business of Agribusiness – From the Roots to the Fruits --", University of Asia and the Pacific in association with FIDEI Foundation, Dr. Rolando T. Dy, Marie Annette Galvez-Dacul, Ditas R. Macabasco, Senen U. Reyes, Florence Mojica-Sevilla, 2011.

For instance, Myanmar Awba Group has developed a scheme of crediting loan for the farmers with severe fund operation. It provides a short term loan with funding period of 4 months with the interest of 3%, for which it has ruled out the ceiling of credit amount according to land holding sizes and repayment is as a rule by cash. However, in such a case that an unfavorable situation for farmers who have to pay back arises from, for example, sudden deep of crop commodities price levels etc, repayment in kind is also accepted. In this connection, Myanmar Awba Group has made it a rule not to provide fund in the areas with higher risk on cropping and it specifies the areas where flood take place almost every year like Ayeyarwady River basin etc as the highest risky areas.

7.3.2 Negative Impacts

(1) Demerits of contract cultivation

On the contrary, contract cultivation has several demerits. In cases that producers have weak capital procuring capacity while the purchasing side is nothing but a singly operating enterprise, it is inevitable that the producer's side has to close cultivation contract under relatively disadvantageous situation. In particular, in such frequently flood affected areas as Ayeyarwady River basin, the producer's side would suffer from most of demerits or damages brought about by natural disasters.

Likewise, in some cases the enterprise side averts highly risky areas by adverse climate / natural disasters. The above-mentioned Myanmar Awba Group also avoids them by delineating Ayeyarwady River basin as an area of high risk, thus excluding it from the target area of short-term loan granting.

Yet, in cases where defaulting of debt farmers takes place by severe flood damages etc, not only farmer's side but enterprise side cannot avoid encountering management crisis by the aftermath of disasters, either. According to MAPCO, as of 2013, many rice producing enterprises were obliged to halt their operation due to lack/ shortage of operation fund. Further, in a case, as observed in Myanmar, of underdeveloped farmers' organizations, the enterprise side cannot help closing contract with individual farmers, leading eventually to expansion of negotiating/ trading cost.

(2) Land problems

On the other hand, the problems attributable to land expropriation by private enterprises have become one of social problems in recent years. Since foreign enterprises do not have right to possess usufruct right of land, it is inevitable to invest on land in a form of joint-venture with Myanmar domestic enterprises. The approval of Myanmar Investment Committee (MIC) on the transfer of any land right cannot be obtained either in cases where such sponsors as foreign enterprises cooperate/ sustain the land acquisition behind domestic enterprises. However, in reality, cases seem to be increasing where Myanmar agents acquire land through the financial assistance from foreign enterprises because MIC's checking function fails to detect and control transfer of land/ land right.

Furthermore, disputes accompanying with land price surge have taken place. Since 2012, land price (value of land use right) has been skyrocketed especially around such project areas as irrigation works, road construction works, creation of industrial parks etc. Transaction of land use right has been in a state of free pricing provided that selling side and buyer mutually agrees. In transferring land use right, the applicant is required to report the transaction to Land Use Right Committee and to register the transfer in TS office. This committee does not monitor land price, nor vested any authority of controlling land price. Responding to such a social background, "Shouting Disputes" have actually been occurred in which people appeal that the amount of compensation is too low compare with the loss of evacuation, thus stakeholder farmers try to pick disputes or importuning to their profit. At the same time, since farm households were allowed holding land ownership in 2012, the ownership release evoked conflict problems on land inheritance among family members.

CHAPTER 8 ISSUES AND COUNTERMEASURES TO REALIZE AGRICULTURE DEVELOPMENT PLAN

Issues in agriculture sector discussed in this chapter is compiled by the JICA survey team based on questioner and interview survey to concerned ministries, government institutions, and development partners, in addition to statistics, policy papers and study and project reports. The government institution includes National Banks, research and development institution such as DOR, CARTC, VFRDC and IFT. Also, the survey team conducted interview survey to private sector including UMFCCI, MRF MLF and MFF, and other associations, millers, processors, traders and NGOs.

8.1 Institutional and Structural Issues to Plan and Implement Government Policy

Agriculture makes up 35% of GDP, and important sector in National Economy in Myanmar. The government which starts March 2011 regards the sector as “Basis of All Industries”. Ministry of Agriculture and Irrigation clarify its basic strategy as a) development of new farmland, b) supply of enough irrigation water, c) promotion and support of agriculture mechanization, d) application of advanced technologies, e) development and use of new varieties. In addition, to improve quality and increase production, the Ministry nurtures human resource who can bear agriculture development through research institutes and higher education institutions. However, there are many institutional and structural issues to plan and implement government policies.

8.1.1 Institutional Capacity Development (Nurturing Technocrat)

President U Thein Sein regime rapidly promotes several renovations including economic reform, and nurturing human resource who can bear nation-building becomes critical issue. At present, government capacity to tackle development issues, in view of staff, organization, institution and finance, is not enough when we compare to magnitude of the issues.

Agriculture sector is an essential industry, and increasing productivity, market-oriented economic reform, increasing high value adding and capacity development of technocrat for agriculture sector policy making are needed by means of Public-Private Partnership and poverty alleviation. From now onward, it is needed that decision makers are those who are vastly-experienced and technically pre-eminent persons, and who can solve development issues on the basis of scientific and rational method without traditional economic philosophy and political power. Following table shows Issues and Countermeasures on Human Resources Development.

Table 8-1 Issues and Countermeasures on Human Resources Development

Issues	Countermeasures	Current Activities
ž Number of staff in the governmental agencies handling individual development issues, and their organizational, financial and institutional capacity are relatively insufficient as compared with the quantity of issues to be tackled. ž Few human resources are available who can cope with needs of markets and producers that are diversified and highly escalated. ž Materials available in educational / training facilities have become dilapidated or out of order.	ž Formulation of development programs in which development strategies/ rank of priority is clearly elucidated. ž Developed, up-dated human resource nurturing programs ž Nurturing human resources who can cope with needs of markets and producers that are diversified and highly escalated ž Up-dating and provision of educational / training materials –equipment and facilities	ž JICA has dispatched an advisor of agriculture/ rural development to DAP for tackling for improving MOAI's capacity of planning, developing and adjusting/ coordinating related activities. ž JICA is also planning a scheme of strengthening organizations for agricultural human resource development (as non-reimbursable grant aid project) and a related technical assistance project. ž ADB provides TA for administrative capacity of the government

8.1.2 Agricultural Extension and Research and Development

(1) Agricultural Extension

It is important to think that, a) what kind of technology, and how disseminate it, in the relation of b) extension service providers and c) service receivers. When we think about enhancement and promotion of agricultural extension, it is necessary to look into whether a) to c) are functioned for the attainment of their objectives. From this point of view, followings are issues on agricultural extension.[66]

a) Quantitative expansion and qualitative improvement of extension facility, equipment and workers so that they can cover all farmers
b) Enhancement of communication method and tool to farmers
c) Enhancement of transportation means including rainy season. Extension workers use vehicle, boat, motorbike and bicycle, but not enough. In some area, the workers use bus or just walk
d) Enrichment of farm inputs including fertilizers and pesticides
e) Enhancement of support means and follow-up to farmers who suffer lack of credit for agricultural production
f) Effort to response to research and development for rich agro-ecological condition of Myanmar
g) Extension activities and ethnic issues between peoples in different language and customs
h) Paradigm shift from government-lead to farmer-lead agricultural extension

Based on the above discussion, issues and countermeasures on agricultural extension are summarized in table below.

[66] "Present Status, Problems and Issues on Agriculture Extension System in Myanmar", Shun Suzuki 2004, P145

Table 8-2 Issues and Countermeasures on Agricultural Extension

Issues	Countermeasures	Current Activities
ž Extension facility, equipment and staff are in short of needs in both quantitative and qualitative terms. For example, in Central Dry Zone, it is found that an agricultural extension staff deals with 4 Village Tract and 900 farm-households (as of 2007). ž Method and means of communicating with beneficiary farmers by the staff are not sufficient. ž Means of transport for extension staff is far from satisfaction. ž Such farm inputs as fertilizers and agricultural chemicals are not enough to meet the demand. ž Necessity of shifting orientating pattern from administration leading type to bottom-up one by farmer's initiative ž Necessity of providing extension services on basic managerial judgment	ž Renewal of extension facilities/ equipment matching with real needs of markets and supplier-producers ž Creation of extension system making effective use of available communication means such as cell phones ž Pertinent, increased supply of farm inputs (such as fertilizers) ž Introduction of crop cultivation system by which substantial yield level can be expected even with low leveled input application ž Provision of farming instruction (farm management) ž Development of human resources capable of suggesting diversified options to the beneficiary farmers ž Pragmatic application of Farmer-to-Farmer Extension system	ž ACIAR plans to launch research projects dealing with rice, pulses, animal husbandry, fisheries and socio-economic matters (extension) ž In the past, JICA implemented MOAI agricultural extension staff human resources development strengthening project (2009-2011), and a study on area development plan for poverty reduction in Central Dry Zone (2006-2010). ž Agricultural producers' groups belonging to the category of UMFCCI and MRF are providing capacity building for farm producers ž A host of NGOs are engaged in capacity building for inhabitants.

(2) Research and Development

Investment in research and development of agricultural field in Myanmar is lower than that in other countries in the world, as following figure indicated. As a result, agricultural production is on a plateau, and increase of production depends on horizontal expansion of planting area.

Portion of Agri-sector R&D budget in 100$ of Agri-product (Unit: US$)

Advanced Economy	2.40
Sub-sahara Africa	0.72
Developing Countries	0.53
Asian Countries in 2008	0.41
Myanmar 2003	0.06

Source: ASTI（2009）

Department of Agricultural Research is in charge of agricultural research and extension under MOAI, but DOA, ID and YAU have also research function. As of 2008, 62 doctor degrees and 244 master degrees are work for DAR, but the number is smaller than other ASEAN countries.[67] From now on, as a member country of ASEAN, it is necessary to take positive approach in this field through working-level training and R&D collaboration with neighboring countries.

As a higher education institution for agriculture, Yezin Agriculture University (YAU) nurtures agronomist and agricultural engineers in MOAI and private sector. Under Department of Agriculture (DOA), Central Agriculture Research and Training Centre (CARTC) and Vegetable & Fruits Research & Development Center (VFRDC) play the role of accumulating specialized knowledge and

[67] Agriculture Science and Technology Indicators 2007

technologies of agriculture, and periodically provide trainings to staffs of MOAI including agricultural extension officers. These centers have a good relationship with YAU, and exchange of knowledge and technology is frequently performed between researchers and professors.

Through capacity development of government officials, farming technology dissemination, quality improvement and production increase are carrying out in agriculture sector in Myanmar. On the other hand, capacity development of human resources who can develop technologies on crop production in accordance with diversified environment of the nation and high value-added products which meets diverse and highly-developed market needs. However, life-expired and obsolete training equipment and facilities are constraints and improvement is required.[68]

According to MOAI, following 5 issues are to be addressed.[69]

a) Establishment of food security coping with climate change and population increase
b) Shifting from resource-exploitation farming system to innovated technology-based farming system
c) Enhancement of competitive power by producing high-quality and high-value agricultural commodities under free trade environment with ASEAN countries
d) Establishment of crop production technologies adopting diversified agricultural environment
e) Enrichment of agricultural engineers. At present, number of the engineer is 9,200, and proportion of engineer in total population is 1/6,500

Following table shows issues and constraints on research and development in Myanmar.

Table 8-3 Issues and Countermeasures on Research and Development

Issues	Countermeasures	Current Activities
ž The ratio of agricultural research cost to the productive farm output equivalent to US$100 in Myanmar is calculated at 0.06%, indicating an extremely low level as compared to Asian average, 0.41% or to the mean level for developing countries, 0.53%. ž The least number of research staff among ASEAN members (62 doctors, 224 masters as of 1008) ž Dilapidated research facilities/ equipment ž Above all, bio-technological research has been much behind the time without any experience / any budget provision, and the state of private sector is similar to that of public one. ž Lack of research system in response to diversified locality	ž Consolidation of research facilities ž Improved capacity of researchers ž Participation in staff training, engagement in collaborated research development with those in neighboring countries as a member of ASEAN ž Promotion and fortification of research development projects in conformity with needs of markets inside and outside of Myanmar (such as varieties, processing techniques, residual agro-chemicals etc) ž Creation of research system in line with diversified local development potential in different areas	ž ACIAR plans to launch research projects dealing with rice, pulses, animal husbandry, fisheries and agricultural extension ž JICA schedules to implement a plan for strengthening organization developing human resources (on non-reimbursable fund basis). Also, it launches a project targeting to DAR and DOA on quality seed multiplication as well on water-saving farming techniques development ž In terms of research development, activities, few activities have been provided in the sub-sector of farm mechanization, creation of value added to farm produce. ž USAID has a plan to assess issues on starvation and poverty alleviation with MDRI. ž India establish ACARE to transfer technology to agri-related scientists

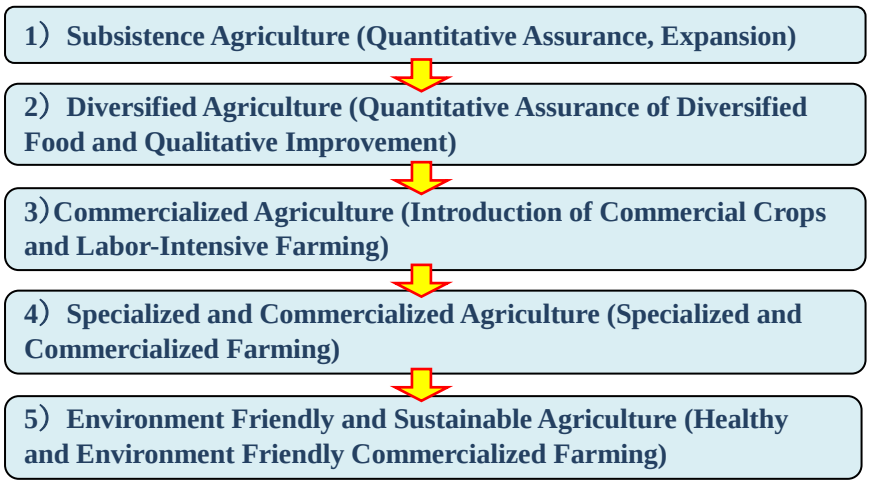
[68] JICA Report, Preparation Study on Agriculture Human Resources Development Project, 2013
[69] Human Resources Development in Agriculture Sector Development: MOAI

8.2 Issues on Developing High Potential Agriculture

8.2.1 Capacity Development of Farmers

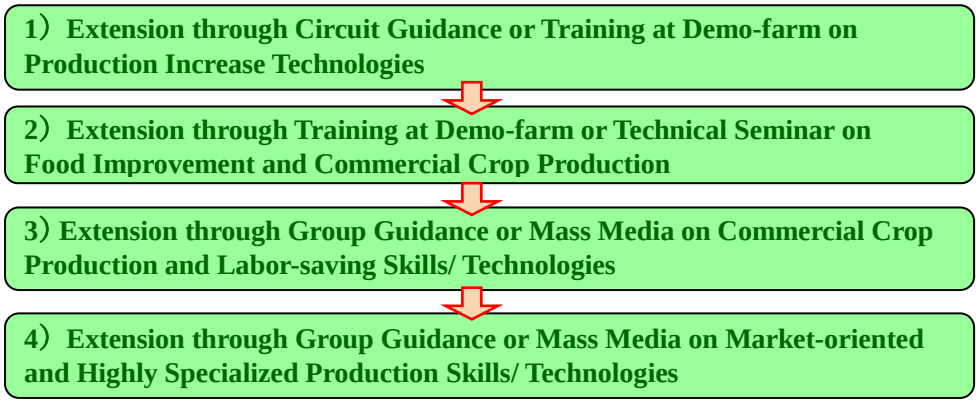
In general, development stage of agriculture can be summarized as follows.[70]

Figure 8-1 Development Stage of Agriculture



Agriculture extension changes in accordance with change of agricultural development stage as follows.

Figure 8-2 Changes of Agricultural Extension



According to Suzuki (2004), Myanmar agriculture is regarded as reaching a stage of the diversified agriculture with quantitative assurance of diversified crops and qualitative improvement. As for extension level, extension through technical demonstration or technical seminar on crop diversification and commercial crop production must be effective. For this purpose, the government has been taken selection and dissemination of production technology/ skill in consideration of diversified agro-ecological condition.

In near future, Myanmar agriculture is expected to shift to 3rd stage, commercialized agriculture where commercial crops production and labor-intensive farming method are introduced. In this regard,

[70] "Present Status, Problems and Issues on Agriculture Extension System in Myanmar", Shun Suzuki 2004, P145

it is important for agriculture extension worker to prepare for the forthcoming change, and grasp changes when it happens. Followings are issues to be prepare for the forthcoming change.

(1) Agri-business Diagnosis and Proper Instruction

Agriculture asks farmers from farm management, including proper judgment, through-out production period which consists of input procurement and application, production and marketing of products. To materialize income generation which is a target stated in agriculture and rural development program, development of extension service for basic business management to farmers.

(2) Enhancement of Decision Making and Production Skills of Farmers

A production skill/ technology which maximize production volume, is not always adoptable to farmers. Farmer needs those skills and technologies that meet diversified agro-ecological condition, socio-economic condition, market trend and their cropping pattern.

Procurement of agricultural inputs are quite limited if a farmer do not have enough budgets for investment, and investment must be highly risky in those areas including Cyclone prone areas, flood affected areas, and vulnerable areas for climate change. Farmers who live in risky areas need, not farming system with higher return from much input, but the system with moderate return from low input. To meet diverse needs of farmers, it is needed that extension service providers have to have alternative skills/ technologies of faring method. It is also important that agriculture extension officers who receive training disseminate the skills to farmers, under monitoring by DOA office in TS.

(3) Enhancement of Farmer-to-Farmer Extension

Mobilization of extension workers is one of constraints of current extension system. Even though DOA introduce new extension contents base on farmers needs, is it impossible to provide the service to all farmers if budget is not enough. Therefore, to complement activities of the extension workers, maximum utilization of regional resources is quite important. In this regard, Farmer-to-Farmer Extension is effective where a practical core farmer receive trainings intensively, and the core farmer extend the skills learned to other farmers.

To practice the Farmer-to-Farmer Extension, try and error process of identifying core farmers, developing training modules for the core farmers, and developing support system of the Farmer-to-Farmer Extension, are important to withdraw lessons learned to establish effective extension system. Ideal activities of the core farmers are establish demonstration farm in the core farmers' field and demonstrate farming skills and technologies which are recorded and displayed at the demo-farm for dissemination purpose.

8.2.2 Promotion of Agriculture Modernization Particularly Rice Production

Main issues of agriculture sector are a) food security, b) productivity increase, and c) export promotion, and these three issues have a close connection each other. Agriculture sector contribute a lot for achieving national goal which is to stabilize peoples' income and welfare, since most people in rural area, which accounts for 70% of national population, depend on agriculture sector.

To promote agriculture modernization particularly rice production, mechanization and financial accessibility is important issues.

(1) Agricultural Mechanization

Agricultural mechanization is effective to increase production efficiency, but it also increase production cost of farm households. In Myanmar, agricultural mechanization is not yet popularized due to small farm lot size, narrow and underdeveloped farm road, and lack of budget for farmers to procure agricultural machinery. Following table shows issues and countermeasures on farm mechanization.

Table 8-4 Issues and Countermeasures on Mechanization

Issues	Countermeasures	Current Activities
ž Farmland size is averaged at as narrow as 2.4ha/farm-household, and the plots are not yet consolidated into machinery operable blocks, still remaining narrow access roads, thus utilization of large-sized farm machinery has hardly been promoted. ž Difficult access to farming loans for purchasing farm machinery ž Group-purchasing of farm machinery or joint use of machinery among group members has not promoted due to reluctance of group activities. ž Dilapidation of farm machinery and resulted frequent mechanical troubles at AMD Tractor Station ž In AMD Farm-Mechanization Training Center, repair of dilapidated farm machinery and provision of bran-new machinery for training can hardly realized owing to insufficient management budgets. ž Because markets of machinery and those of spare-parts are insulated and sellers of machinery do not take responsibility for supplying / procuring spare-parts, it takes much time to obtain spare parts.	ž Consolidation of farm plots into adequate blocks for mechanization, improvement of access farm-roads ž Improved access to farming loans by small-holder farmers ž Acceleration of farm mechanization through MFA (Myanmar Farmers Association) and RSC (Rice Specialization Companies) etc ž Renovation of materials and facilities in AMD Tractor Station /AMD Farm-Mechanization Training Center ž Up-dated training program in AMD Farm-Mechanization Training Center (on scientific basal techniques, coping with newly developed types of farm machinery, manual for repairing etc) ž Attaching duty of supplying spare-parts to machinery sellers (during the period of contracted maintenance duty)	ž Farm machinery has been procured by imports, and also produced by MOAI and private sector enterprises. ž MOAI, AMD has promoted farmland reclamation, farmland consolidation, accelerated farm mechanization, production of farm machinery, provided training on the use of machinery, but these activities have been confined to rice paddy cultivation. ž JICA provided cultivating machines while FAO•KOICA and JICA donated machinery for post-harvest operation. ž IFAD, KOICA and JICA have implemented or planned projects including farm-block consolidation

(2) Accessibility to Agricultural Credit

Myanmar Agricultural Development Bank (MADB) provides the seasonal loan for crop production and the term loan for procurement of farm input including machinery and working animals. However, loan amount is limited and not enough of cover all production cost of farming.

Other possible institutional finances for farmers are Global Treasure Bank Public Co., Ltd., Myanmar Economic Bank (MEB), and Myanmar Small Loan Enterprise (MSLE). If farmers organize a cooperative, they can borrow money from the cooperative. However, rate of organizing cooperative in rural area is quite low.

As a result, accessibility for farmers to institutional finance is still poor. To develop rural finance

system, building-up intermediate system to loan rural area is necessary.[71]

Table 8-5 Issues and Countermeasures on Agricultural Finance

Issues	Countermeasures	Current Activities
ž Loan amount has been confined to certain degree due to insufficient fund provision and limited organizational capacity of funding agencies, for example, only 30 - 40% of the rice production cost is actually granted to an applicant farmer. ž Cooperative organizing rate remains at low level that constitutes a condition of acquiring loans by Ministry of Cooperatives. ž Because institutional funds accessible by farmers are limited and their grant amounts are not enough, 30 - 40% of rural population depend on loans supplied by informal money lenders. ž About 80% of the loan amount granted from MADB are concentrated on rice producing farm households, thus it is too difficult for farmers who produce vegetables and fruits to acquire loans from this source. ž Many cases of difficulty in repayment arise from weather vagary.	ž Improved fund institutions matching farmers needs ž Since many banks other than MADB target urban population, development of fund-mediating institutions is essential that can serve population in rural areas. ž MAPCO has started a study on crop insurance such as weather index insurance, and such support towards institutionalization is necessary.	ž UNDP and LIFT have provided micro-finance coupling with NGOs (including PACT, World Vision etc). ž JICA is studying agricultural funds. ž 118 groups have been listed as licensed MFI (NGOs, cooperatives etc), however, they have been able to provide only about 30% of the total demand for fund.

8.2.3 Technical Issues on Agricultural Productivity

(1) Improving Agricultural Productivity[72]

Top-down approach for crop production restricts flexibility and also acts as disincentive to production, resulting in low productivity. Sticking production plan with less attention on comparative advantage of the crop is disincentive to the farmers with less effort on crop production and also leads to underutilization of the resources. Under the restricted crop choice under irrigation, the farmers put much effort to grow paddy in Yar land (sandy soil) with high investment on irrigation and land preparation. Normally dry land crops such as oil crops and pulses can get high yield with minimum amount of supplementary irrigation.

Strategy to food of the country is emphasis more than on national and sub-national self sufficiency but less on household level. Production is, of course, an important tool to improve rural welfare, but the present policy has paid too much attention to rice production without realizing the important facts such as grown of income, and its stability and sustainability while increase rice production is merely a tool to achieve the end.

Technical supporting for improving the agricultural productivity is also requisite in parallel with the flexibility for crop sowing. Due to the delay of disseminating the high-quality varieties, the crop yield per unit area in Myanmar is lower than the other ASEAN countries as well as the input of fertilizers per unit area, thus resulting in low farm productivity. The following table shows the issue to be tackled and conceivable measures in terms of improving agricultural productivity. [73]

[71] Following table shows issues and countermeasures on agricultural finance.
[72] Following table shows issues and countermeasures on agricultural finance.
[73] Agriculture development issues and Strategies, Myanmar 2011 P49

Table 8-6 Issues and Countermeasures on Agricultural Inputs

Issues	Countermeasures	Current Activities
【Introduction of high yielding varieties and quality seeds】 ž Quality of rice seeds is mostly poor and supply of quality seeds remains only about 10% of the required quantity. ž Markets of rice seed have not yet been modernized. ž Price level of rice is too low to deserve using quality seeds. ž Vulnerable quality management system including appraisal of seed harvesting plots ž Diffusion of approved quality seed has been hampered by illegal imports of low quality seeds from borders of China /Thailand. ž Pulse seeds, 90% of which are self-harvested from individual farmers' plots in major producing area, Central dry Zone, consist of different varieties as admixture. ž Supply programs of quality seeds have not implemented so as to meet state of farming by individual farmers. ž Short of human resources for extension activities who instruct quality control of quality seeds ž Though Seed Act has been in force since 2012 by the assistance of FAO, its executive regulations have not yet established. ž Seed policy has not yet formulated.	ž Provision of the strategy for diffusing quality seeds in conformity with ecological farming environment / state of farming ž Strengthening system of developing, selecting, producing and diffusing high-quality varieties and achieving low-cost for their production ž Improved techniques for quality control (appraisal of seed-farm-plots etc) in producing seeds ž Modernization / consolidation of rice markets ž Provision of low interest farming loans ž Strengthened control system of importing goods at the frontier borders ž Protection of New Crop Varieties and promotion of investment to seed companies in the private sector ž Fortified instructive/ useful extension activities on seed management at farm-plot level ž Establishment of executive regulations of the Seed Act ž Formulation of seed policies	ž Seeds have been produced by DAR（rice, maize and other cereal seeds, oil seeds, seeds of pulses etc）, by DOA (rice, maize and other cereal seeds, oil seeds, seeds of pulses, vegetables etc) and by DICD (seeds of cotton, rubber, oil-palm, sugarcane etc). ž Seed policy has been supported by FAO, ADBI etc. ž IRRI has been assisted for introducing quality rice seeds. ž FAO as well as NGOs have assisted by donating seeds and providing means of multiplying them. ž Seed companies of private sector (major 6 enterprises) have been producing seeds of rice, maize and vegetables. ž In local areas, associations of rice-millers have been producing rice seeds. ž JICA has been implementing a project for multiplication and quality improvement of rice seed. ž ICA has been conducting a study on the application of low-interest loans for farming.
【Farm inputs】 ž Level of utilizing farm inputs in Myanmar is extremely low among South-East Asian countries, thus resulting in low farm productivity. ž (Quality control on marketed agricultural chemicals and fertilizers has not effectively been practiced. Above all, inspection/ control system at the border front has not been consolidated.) Difficulty confronted by farmers arises from accessibility of funds for purchasing fertilizers.	ž (Improved agricultural extension services and assisting systems for distributing affordable seeds and fertilizers) ž Strengthening the system of controlling fake/ poor chemical fertilizers (especially for rejecting low-quality chemical fertilizers from China) ž Consolidation/ improvement of laboratory for fertilizer inspection under Agricultural Department ž Improved access to funds for small holding farm households ž Promotion of producing chemical fertilizers by utilizing natural gas ž Technical exploitation and diffusion at low cost making use of micro-organism inputs etc	ž Fertilizers have been donated from FAO and NGOs. ž Ministry of Energy is responsible for allocating natural gas to chemical fertilizer production activities. ž Myanmar Fertilizer Seed and Pesticide Entrepreneurs Association represents the industrial group concerned. ž TPA is testing the application of a recycle-type farming model in a JICA partner project.

(2) Issues on Each Crop

Table 8-7 Technical Issues and Countermeasures by Crops

Issues	Countermeasures	Current Activities
【Rice】 ž Low profitability of dry-season paddy (attributable to consumptive use of diesel oil for driving pumps and resulting high cost) ž Poor quality control on rice seed, and resulted high rate of broken seed grains due to mixed rice varieties with different sizes/ length of grain ž Since a large part of farm-inputs (chemical fertilizers, diesel fuel, farming machinery) has been relied on imports, input price level tends to be expensive. ž Fertilizer application rate per unit cultivated area remains at very low level in contrast with international standard. ž Compulsory paddy cultivation in the area where irrigation facilities have been completed	ž Improvement of production techniques ž Promotion of cultivation based on the comparative advantage such as crop profitability, and extension of basic knowledge for crop selection ž Improved and diffused quality control techniques on seed production ž Provision of low-interest farming loans ž Promotion of catch-crop cultivation such as pulses by water-saving irrigation ž Establishment of trade by setting reasonable purchasing prices in compliance with quality of paddy rice	ž MRF has strengthened value-chain of rice as a group of this trading market 7 Groups including Millers Association, Traders Association, Rice Producers Association, Farmers Association belong to this category. ž JICA is implementing a project for increasing the production of rice seed and for improving their quality.
【Oil-seeds】 ž About 80% of farm households self-supply seeds of oil crops in Central Dry Zone, leading to the degradation of seed quality. ž Mixing of different color grains and residual agro-chemicals remain issues in exporting sesame from Myanmar. ž Groundnut is apt to be contaminated by such mold-derived toxic substances as aflatoxin. ž The domestic production of edible vegetative oil has not enough met domestic consumption and Myanmar annually imports around 200 thousand ton of palm oil.	ž Selection of suitable seeds and diffusion of seed management techniques ž Improved and diffused post-harvest treatment techniques including improved method of drying sesame seed in producing plots ž Promoting extension of techniques to reduce level of residual agrochemicals by such measures as application of comprehensive pests and diseases control measures, appropriate use of agro-chemicals, utilization of organic bio-agents ž Consolidation / provision of post-harvest treatment facilities including air-conditioned warehouses	ž FAO provided assistance for establishing an oil purification plant and related technical improvement project (completed in 2013) ž JICA schedules to assist production of oil-seeds in Central Dry Zone. ž As related groups of this domain, Myanmar Pulses, Beans & Sesame Seeds Merchants Association and Myanmar Edible Oil Dealers Association belong to this category.
【Pulses】 ž Seed quality used by farmers has been degraded year after year. ž Moisture content of green-gram seed produced in Central Dry Zone tends to be higher. High moisture often fosters mold generation or the occurrence of pests during the period of transport by boat. ž In recent years, outstanding quality degradation of pigeon pea has been observed (for example, immature seed, wrinkled epicarp, molded grain, colorless grain etc)	ž Regeneration of seeds ž Selection of appropriate seed grains and diffusion of seed management techniques ž Improved and diffused post-harvest treatment techniques ž Provision/ consolidation of post-harvest treatment facilities equipped with driers or air-conditioners ž Provision of study/ research on wilting point in Central Dry Zone	ž ACIAR and JICA plan to assist production of pulses in Central Dry Zone ž Myanmar Pulses, Beans & Sesame Seeds Merchants Association has been established as the group related in this field.

Issues	Countermeasures	Current Activities
【Sugarcane】 ž All the existing sugarcane mills have been privatized, however, their operation rate remains low as facilities are increasingly dilapidated. ž Electricity supply to sugar mills has been unstable.	ž Stabilization of electric supply	ž DICD is operating seed production and extension. ž "Myanmar Sugarcane and Sugar Related Products Merchants and Manufactures Association " represents private groups of this domain.
【Natural Rubber】 ž Quality of natural rubber produced in Myanmar has been poor, spoiling its international dealer's image. Price level of domestically produced natural rubber remains lower level than average price of TOCOM by about US$100 - 200/t. ž Even though individual producers/ plantation strive for higher quality, purchasing price cannot reflect quality level by differential pricing due to the negative influence by poor quality products. ž Lack of consolidated quality control system ž Productivity of natural rubber has been low, with a unit yield of 670 pond/acre/annum, that is less than half of the yield level of other producing countries （1,500 - 1,700 pond/acre/annum）. ž 40 - 50% of rubber trees are as old as 50 - 60 years. It suggests necessity of replanting, but it is difficult to provide regeneration cost for small-holders.	ž Establishment of such quality control system is required in which public organization provides services of laboratorial test inspection and issues quality certificate for the inspected products. ž Improved post-harvest treatment techniques, Improved products quality ž Re-plantation of rubber forests ž Improvement of processing techniques	ž DICD is responsible for seed production and extension ž As related group in private sector, Myanmar Rubber Producers' Association has been established.
【Cotton】 ž Quality of domestically produced cotton is lowered due to admixtures mixed at the harvest of cotton-boll, such as leaves and branches, also by mixed impurities at packaging into bags and during transport. ž Moisture content serves one of the causes of degrading quality of product.	ž Improvement of harvesting skills and post-harvest treatment techniques, in particular necessity of improving cotton ginning machine ž Reduction of moisture content in the harvested cotton-boll mostly depends on state of handling products around the harvesting period, during which it is considered requiring rapid harvesting and appropriate transport/ storage.	ž ICD is responsible for seed production and extension ž Ministry of Industry takes charge of processing of cotton.

8.2.4 Support from Production to Export including Basic Infrastructure

(1) Irrigation Development

By completion of 235 dams, 327 pump station for irrigation, and 8,312 groundwater development project for irrigation, irrigation area increase from 1 million ha in 1989, 12.5% of total cultivated area, to 2.33 million ha in 2009, 17.4% of total cultivated area. As a result, cropping intensity increases from 140% in 1995 to 170% in 2008. Rice is major crop in irrigated area and 75% of irrigated area is for rice production. Pump irrigation using river account for 30% of irrigated land, whereas 29% of irrigated land is irrigated by dam and headwork.

Even though there is a progress of irrigation infrastructure development as mentioned above, irrigated area is only 17.4% of total cultivated area. In other countries, the rate is 57.5% in Bangladesh, 47.3% in China, 33.8% in India, 31.9% in Vietnam and 26.5% in Thailand.[74]

Reason why irrigated area is still limited in Myanmar is delay in the construction due to lack of budget to construct main and feeder canal, and compensation problem caused by land acquisition. Land consolidation project is now implemented in Nay Pyi Taw, and consensus building with beneficiaries is quite important through organizing explanatory meeting and participatory workshop to build consensus between the government and beneficiaries. Particularly, careful discussion and enough opinion exchange is required when exchange and consolidation of land is implemented.

Issues and countermeasures on d post-harvest and processing of products are shown in table below.

Table 8-8 Issues and Countermeasures on Irrigation

Issues	Countermeasures	Current Activities
ž ID has expended over 50% of the total annual budget of NOAI, however, irrigation has covered only 17.1% of the total arable land in Myanmar and this rate is inferior to that of neighboring countries such as Thailand (27%), Viet-Nam (32%), India (34%) and China (47%). ž Dilapidated/ deteriorated irrigation facilities ž Some projects are not completed due to short construction budget for major/branch canal networks, or to delay behind construction schedule attributable to dispute on the compensation for land acquisition. ž Extension activities and instruction on the effective use of irrigation water is still insufficient. Farmer's training on water management at terminal plot level and demonstration at exhibition plots are also short.	ž Construction of irrigation facilities and rehabilitation of dilapidated ones ž Institutionalization of irrigation consolidation program in the form of farmer's participatory projects, appointment of officers in charge of social consideration to ID ž Elaboration of legal-compensatory system in terms of land acquisition ž Regular, recurrent provision of farmer's training on effective use of irrigation water.	ž WB, JICA, FAO and UNDP provide assistance for irrigation development ž JICA has provided technical development for water-saving farming in Central Dry Zone. ž NGOs（11groups）have been engaged in new construction/ rehabilitation of groundwater irrigation, water-saving irrigation and irrigation systems.

(2) Post-harvest and Processing of Production

To increase farmer's income, reduction in production cost and increase of added-value is necessary. Quality of most agricultural products in Myanmar is still low and they are exported without any processing procedures, hence no added-value and low price. Issues and countermeasures on post-harvest and processing of products are shown in table below.

[74] ARDC, 2011

Table 8-9 Issues and Countermeasures on Post-harvest and Processing

Issues	Countermeasures	Current Activities
【Post-harvest treatment】 ž Due to lack of available post-harvest treatment/ storage facilities, harvested paddy is often left on paddy field for a long time, leading to higher damage such as crack of un-husked grains, eventually resulting in 10 - 20% post-harvest loss. ž High ratio of broken rice is found in many rice-mills, thus quality problem of rice often arises. ž Although a few modern rice-mills have been constructed, they are often left in a state of idling, thereby lowering operation rate of milling machines. ž Low rate of progress of streamlining post-harvest treatment facilities has led to high rate of marketing loss of perishable vegetables/ fruits. ž In the areas where farmers ought to use diesel mounted milling machines on account of lack of electricity supply, higher milling cost often results, thus affecting their farm management economy.	ž Consolidation of post-harvest treatment facilities for rice paddy including warehouses/depots and threshers ž Modernization of rice milling techniques ž Creation of post-harvest treatment facilities for agro-perishables (such cold-chain elements as lot-collecting points and (pre-)cooling houses) ž Improved packaging techniques for agro-perishables ž Essential development of consistent policies, institutions and technical extension covering from production to post-harvest treatment so as to realize quality control/ cost reduction (coordinated promotion by both MOAI and MOC).	ž Target of post-harvest treatment assisted by AMD is mainly rice-paddy. ž Quality inspection / training has been provided by PTAC under the umbrella of MOC, however, its training activities remains inert (almost no development has been made in the field of post-harvest treatment techniques). ž Assistance on post-harvest treatment has been carried out by JICA (through grass-root aid program), UNDP and LIFT. ž KOICA is constructing a training facility for post-harvest treatment targeting rice and such fruits as mango.
【Processing】 ž Most pulses have been exported without value-addition by processing ž Short processing techniques and information thereon ž Under-developed processing industries, exploitation of processed foods have not so much been progressed.	ž Nurturing farm-products processing industry, introduction of subsidy policies on processing ž Sorting by size of products, fractioning by color of products, introduction of processing machinery such as pealing machine ž Strengthening development/ training/ extension of post-harvest treatment techniques (such as modernization of processing equipment, employment of new staff, up-dating of training program)	ž Agro-processing has mainly been put under the jurisdiction of Ministry of Commerce and that of Industry (Ministry of Industry is responsible for the approval of establishing food processing enterprises) ž Private groups belonging to the line of Ministry of Commerce mainly assist enterprises for value addition. ž FAO provided assistance for improving quality inspection techniques to be applied to edible vegetable oil (completed in 2013). ž Few NGOs have assisted improvement of value addition.

(3) Distribution and Export of Agriculture Products

Issues and countermeasures on distribution and export of agriculture products are shown in table below.

Table 8-10 Issues and Countermeasures on Marketing and Export Promotion

Issues	Countermeasures	Current Activities
ž Lack of effective marketing infrastructure ž Efforts of improving quality of marketed goods are not remuneratively reflected into their prices. Chinese dealers do not give higher value to high quality goods, thus they never make farmers any incentive. ž Due to lack of decent maintenance, feeder roads become muddy with the onset of rainy season, often leading to higher transportation cost, serving as hindrance / obstacle of transporting farm produce. ž In some cases, lading cost of farm produce from harvesting areas to Yangon port happens to become higher amount than purchasing price of farm products ž Inspection system for residual agro-chemicals etc is not yet developed responding to quality level demanded in the international market. ž Supporting measures applicable to small-holding farmers who cannot cope with rapid price fluctuation of farm products and quickly changing market trends.	ž Strengthened imports control system for imported agro-chemicals, fertilizers etc at border fronts ž Support for consolidation at hard-ware side including farm roads, warehouses, means of transportation, electricity supply etc, along with that for improvement at soft-ware side including market intelligence ž Harnessing quality control inspection system targeting residual agro-chemicals etc and improvement of post-harvest treatment techniques	ž MOAI issues license document for importing agro-chemicals/ fertilizers, while MOC takes charge of controlling exports/ imports. DOA is responsible for quarantine at border front and international airports. ž MOAI (DAP) and MOC (DTP) supply information on market intelligence and private associations belonging to the category of MOC provide it for their members. ž Foods have been inspected by MOAI (DOA), MOC (PTAC) and Ministry of Health (FDA) and similar inspections are also provided by the private sector including chamber of commerce (MFPEA), SGS and OMIC. ž GIZ is strengthening value-chain of mango and tea in Shan Province as a series of assistance for small- and medium scale enterprises. ž USAID carried out a study on the fortification of value-chain targeting farm products.
ž Supply of market intelligence is confined to one-way flow from influential dealers, and Chinese dealers have played role of Price Maker in the field of frontier trade. ž Lading cost at Yangon port is notoriously expensive, universally known as an inefficient port. Loading/ unloading operations are quite often congested and stagnated due to dilapidation of port operating facilities and limited capacity of lading/ unlading, not only leading to higher demurrage rate but also to affecting rice quality. ž On account of lack of consolidated post-harvesting treatment facilities, importance has been more attached to quantity than quality of rice, eventually entailing to Myanmar's weaker competitiveness by lower quality rice exports in international market, thus failing to meet diversified international demand for rice.	ž Formulation of strategic configuration program for marketing infrastructure and improvement thereof in line with the formulated plan ž Modernized streamlining of port operation facilities and improvement on the operational capacity of lading/ unlading ž Development and diffusion of post-harvest treatment / processing facilities in compliance with current needs of international market (harnessing international competitiveness) ž Creation of a system/ technical diffusion for the purpose of harnessing international competitiveness of the value-chain as a whole covering from rice production to post-harvest treatment	ž Trade promotion department of MOC provides assistance for export promotion. ž Also, private commercial associations belonging to the category of MOC have provided various supports on trade promotion. ž Ministry of Transport takes charge of consolidation of port operation facilities.

8.2.5 Issues on Livestock Sector

(1) Degenerated Breed Stock[75]

Almost all of the breed stocks in rural areas are raised by domestic breeding practices. Due to degenerated breed stock the growth of the livestock animals are relatively low compared with the private livestock raising farms. Artificial insemination could play an important role in providing genetically improved animal breeds. However, improved artificial insemination services are likely to be the larger commercial herd operators around Yangon and Mandalay rather than the poor performance in rural areas.

Indigenous poultry breeding is being encouraged by LVBD through providing breed stock and technical services in rural areas. However, it is difficult to introduce intensive breeding system on household backyard livestock breeding. Relevant techniques for suitable breeding management to increase livestock production need to be developed. The following table shows issues and conceivable measures for improving a livestock sector.

Table 8-11 Issues and Countermeasures on Livestock Production

Issues	Countermeasures	Current Activities
ž No strategic development plan is available in livestock sector ž Deterioration of breeding-stock for reproduction ž Since artificial insemination (A.I.) service has been provided to commercial facilities in Yangon and Mandalay, it is difficult for farmers to have access to A.I. ž Draught cattle are mainly kept in rural areas, while production of beef cattle remains behind the time. ž Many farm households inherit traditional way of rearing livestock from parents/ relatives to sons/ daughters, so their scientific knowledge is poor. ž Supply of feeds containing poor nutritional ingredient	ž Formulation of development plan in which development strategy and relative priority are made clear ž Enhancement of extension service of A.I. to rural areas ž Nurturing private farms specialized in beef cattle or dairy cattle ž Extension/ fortification of feeding techniques based on scientific knowledge (nutritional improvement, hygienic management, feeding, reproductive management, prevention of contagious diseases etc) ž Increase nutrition value of coarse feed and development of feed supply-chain through the coordination between rice millers and oil extractors	ž DFID, TICA (dealing buffaloes), JICA etc have supported in livestock sub-sector. ž FAO implemented a dairy varieties improvement project (2008 - 2009) in the past. ž Japan Livestock Techniques Association (JLTA) has implemented a livestock development project (2009 - 2010) in Amarapura TS (Mandalay). ž Various private groups have been established covering feeds, buffaloes (Mythum), dairy, layer's eggs, bovine, sheep and goats.

[75] Agriculture Development Issues and Strategies, Myanmar 2011, P50

(2) Issues on Livestock Health/Diseases

The following table shows issues and conceivable measures for the livestock health/diseases.

Table 8-12 Issues and Countermeasures on Disease Control

Issues	Countermeasures	Current Activities
ž Prevalence of such epidemic livestock diseases as foot-and mouth-disease (FMD) ž Occurrence of trans-border livestock diseases by trans-border migration of live animals and livestock products, including bird influenza, virus-origin Porcine Respiratory and Reproductive Syndrome	ž Diffusion of knowledge on contagious diseases to livestock holder farmers and strengthening monitoring system as well as diseases diagnostic techniques on serious occurrence of epidemic diseases at TS level ž Formulation and implementation of effective vaccine production as well as vaccination programs ž Deployment of supplying points of animal hygiene / veterinary service ž Deployment of check-point sites in airports and along state borders ž Development and dissemination of bio-security technology	ž LBVD provides quarantine service at 15 sites including border front ž JICA dispatched the advisor for Livestock Promotion in Central Dry Zone to Mandalay where it also plans to implement a pilot project. ž New Zealand and TICA implemented support for coping measures with livestock diseases.

(3) Issues on Extension Services and Human Resources Development

Concerning extension services and human resources development, University of Veterinary Science (UVS) is the principal livestock breeding agency of higher education in Myanmar and possesses well qualified academic staff for teaching and researching in terms of veterinary science. However, there is no animal science subject in UVS. The following table shows the issue and conceivable measures.

Table 8-13 Issues and Countermeasures on Extension and HRD

Issues	Countermeasures	Current Activities
【Technical Dissemination】 ž Insufficient human resources and budget amount for carrying out extension activities. According to a calculation, LBVD staff stationed at TS level has to cover 16 TS per staff and 3,600 farmers in Central Dry Zone (as of 2007). ž Short technical dissemination and enlightening education toward small holding and medium scale farm households in rural areas ž Most people engaged in animal husbandry and fisheries have small sized activities to whom technical support (livestock feeding management, animal hygiene management, product harvesting techniques, storage/ preserving, marketing etc) is essential.	ž Strengthened extension system at TS level ž Updated contents of technical dissemination and extension program, re-education toward extension staff ž Exploitation of livestock product processing techniques	ž ACIAR schedules to launch a research project covering rice, pulses, livestock, fisheries and extension ž MLF is a group belonging to this category.
【Research and Development】 ž The rate of investment to agricultural research sector remains at one of the lowest level in the world. ž Least numbers of researchers among ASEAN countries ž Advanced aging of researchers, dilapidation of research facilities/ equipment	ž Progress and improvement of epidemiology and inspection techniques ž Exploitation and diffusion of vaccines/ preventive drugs ž Nurturing younger researchers, up-dating of research facilities/ equipment	ž ACIAR plans to carry out a research project in livestock sector selecting LBVD as C/P of the project.
【Human Resources Development】 ž Insufficient human resources who create development strategies, formulate livestock policies ž University of veterinary, a source of creating human resources, has attached biased-importance on veterinary, resulting in a shortage of educational program in livestock/ management sector	ž Development of official's capacity to formulate policies ž Expansion of curricula on livestock management/ production in University of Veterinary	ž JICA dispatches an advisor to Mandalay for promoting livestock production in Central Dry Zone

(4) Limited Market Access for Livestock Products[76]

Access to export markets for frozen broilers and eggs is limited since production and lack of processing facilities are unable to produce the quality and quantity to meet the international standards. Only life animals are being exported through both normal trade and border trade to neighboring countries. Pig and cow meat cannot be exported due to foot-and-mouth disease.

To expand livestock product market, enhancement of quality control system including quarantine and residual inspection for medicine and heavy metal is important, in addition to abolishment of import tax and commercial tax on imported medicines and feed supplemental additives. As other issues to develop livestock processing industry, processing industries on meat and milk products need to develop and weakness in extension and education system inhabits medium and small scale livestock breeding in rural areas.

In addition to the above issues, there exists no modernized slaughterhouse in Myanmar and the quality of products is below standard in terms of hygiene and sanitary measures. Although during the colonial period, slaughterhouses were provided within Yangon City, such facilities are now located at the outside of the city being far from 25 to 30 km and heavily degraded. The investment and technical assistance is required for renovations to the slaughterhouse.

FAO has been supporting the project for enhancing milk consumption and livelihoods through school milk programs linked to smallholder dairy operation since 2012 and supplying milk for 5days per week. Modernized milk processing factories with homogenizer and pasteurizer are a few to meet the requirements. The issues and conceivable measures for market access to livestock sector are shown in the following table.

Table 8-14 Issues and Countermeasures on Access to Market

Issues	Countermeasures	Current Activities
【Marketing】 ž Because cold-chain is still under-developed in Myanmar, problem arise from hygienic management of products ž Since almost no slaughterhouse is found in Myanmar, hygienic management is not enough developed.	ž Promotion for constructing modern type slaughterhouses ž Establishment of hygienic management system for livestock products ž Consolidation of cold chain dealing with livestock products	ž MLF is a group belonging to this category. ž WSPA, an NGO provides support for decent slaughtering
【Processing】 ž System of treating / processing meats is under-developed ž Though cheese and yoghurt have been processed in a part of Shan Province, condensed milk is only available as their processing material for processing dairy products because too few processed milk manufacturers are available who equipped with modern dairy processing facilities. ž Price levels of feeds are high, leading to higher manufacturing cost for dairy products ž Slaughtering of younger aged cattle has been banned by an Act (for prior use of cattle as draught purpose)	ž Development of livestock product processing techniques, diversification of dairy products ž Development of livestock product processing industry, establishment of supporting institutions for this industry ž Introduction of high nutrition value feed and such storage skill as silage and haylage ž Mandalay-based Development, strengthening and nurturing of dairy value-chain	ž JICA is carrying out a study on agricultural funds. ž FAO carries out a support project for small-scale dairy farms. Also, it supports milk supply program to primary and secondary schools. ž India invited daily farmers and government staff for training

[76] Agriculture Development Issues and Strategies, Myanmar 2011, P58

Issues	Countermeasures	Current Activities
【Export Promotion】 ž Entry of Myanmar into export markets for pork, frozen broiler and layers egg arises a problem of failing to meet overseas standards due to lack of consolidated meat treatment and processing system or owing to too small production scale. ž Expensive imported livestock medicines and feed additives	ž Abolition of imposing import taxes and trading tax on the imports of veterinary medicines and feed additives	ž Animal Products Exporters Association has been established as a group developing activities in this sector

(5) Improvement of Fund Access and Statistical Information

Improvement of fund access and statistical information is need due to the limited access to institutional funding sources by small-holding farmers and insufficient data management system in data-files as shown in the following table.

Table 8-15 Issues and Countermeasures on Finance and Statistics

Issues	Countermeasures	Current Activities
【Financial Access】 ž Because institutional funding sources accessible by small-holding farmers are very limited, 30 - 40 % of rural population depend on borrowing from informal money suppliers.	ž Exploitation of loan services for sale targeting small-holding farm households	ž MADB loans can be granted to those who are engaged in livestock & fisheries according to MADB Act, but they are substantially granted only to those who are engaged in agricultural activities. ž Global Treasure Bank provides fund for livestock industry. ž JICA is conducting a study on agricultural funds ž LIFT-PACT carries out support by micro-credit.
【Statistics】 ž Edition of census has interrupted since 1993-94, and after the interruption statistical data has been obtained only by multiplying the last data by growth rates, thus the resulted data are not correct. ž Insufficient data management system in data-files of TS offices	ž Resumption of livestock census by MOLF ž Reorganization of information management system in regional offices	ž No Activity

8.2.6 Issues on Fishery Sector

(1) Issues on Improvement in Fisheries Productivity[77]

The existing fish farm practice is scientific based but the yield is not as the length of culturing period. Most of pellet feed depend on import from Thailand, resulting in the high production cost of aquaculture and no competing with other countries on price. High cost of raw materials like fish meals and pellets is constraints to develop and expand aquaculture industry and to ensure competitiveness of its products in over sea markets. There are enough raw materials in Myanmar to produce fish meals pellets Laucena, Kenaf, rice brand etc.

The prevalence of disease is one of the major hazards in aquaculture. Occurrence of mass mortality in the process of seed production is one of the main challenges in seed production. Department of Fisheries has been undertaking to control and manage diseases. However, capacities as well as

[77] Agriculture Development Issues and Strategies, Myanmar 2011, P57

material and equipment are limited for the identification of diseases. The following table shows the issue and conceivable measures on improvement of fishery sector.

Table 8-16 Issues and Countermeasures on Fishery Production

Issues	Countermeasures	Current Activities
【Production】 ž Few strategic development plans in fisheries sector ž Yield level of aquaculture products is not so high as compared with period of culture. ž High cost of such input feed as fish meal and pellet serves as a limiting factor in terms of development and expansion of aquaculture activities as well as of competitiveness in foreign markets ž Low interest/ concern on product quality, hygienic management	ž Formulation of a development plan n which development strategy/ relative priority are clearly defined. ž Promotion of use of Laucen, Kena and rice bran as feed meal pellet ž Perfection of quality/ hygiene management, promotion of enlightening activities toward fishery population	ž FAO provided support in fisheries field ž KOICA is planning to launch a project on aqua-culture sector (F/S has been completed). ž Several groups have been established belonging to such operation form/ fishery products as marine fisheries, inland water fisheries, shrimp/prawn, crabs, eel, fish-feeds, ornamental fish etc. ž Several NGOs (CARE、GRET、SWISSAID) provide support for aquaculture activities
【Disease Control】 ž Occurrence of massive death of cultured fish	ž Dissemination of knowledge on contagious fish diseases to fishery HH. ž Expansion of local diagnostic service on diseases of cultured fish	ž

(2) Issues on Fisheries-Resources Management

The reduction of the marine resources by over-fishing and coastal habitat degradation calls for urgent needs for active fisheries management in order to a system of sustainability the exploitation for both the small-scale inshore and the large-scale offshore fisheries activities. In the inland water, the known poor populations have only very limited to the aquatic resources and contributes only marginally contribute to the alleviation of rural poverty.[78]

Based on the survey by FAO, the current level of catches from marine fisheries reaches 2 million tons/year, implying excessive catches, though the sustainable level of catches is estimated at one million tons/year. The following table shows issues and conceivable measures for fisheries- resources management.

Table 8-17 Issues and Countermeasures on Natural Resources Management

Issues	Countermeasures	Current Activities
ž Reduction of environmental resources has manifested attributable to random catches and degraded/ deteriorated growth environment along coastal parts. ž Though the sustainable level of catches from marine fisheries is estimated at one million t/on year, current level reaches 2 million ton /year, implying excessive catches.	ž Implementation of fisheries resources assessment ž Formulation of fisheries resources conservation program aiming at sustainable development of small-scale fisheries in in-shore areas and large-scale ones in off-shore areas ž Creation of monitoring system for preventing random/ exhaustive catches of fisheries resources (including demarcation of fishing prohibition area/ period, ban of catching cultured fish etc)	ž FAO carried out support for sustainable fisheries activities in mangrove forests. ž IFT with BOBLME is studying dolphins in Ayerwardy River ž IFT with BOBLME is studying Biomass in Bengal Bay

[78] Agriculture Development Issues and Strategies, Myanmar 2011, P57

(3) Extension Services and Human Resources Development

Though Maw La Myaing University (Mon State) and Pathein University (Ayeyarwady Region) are educating students on marine sciences, there exist no higher educational agencies as well as research and development institutes in terms of fishery sector. The following table shows issues and measures on extension services and human resources development.

Table 8-18 Issues and Countermeasures on Extension and HRD

Issues	Countermeasures	Current Activities
【Extension】 ž Insufficient human resources and budget for disseminating activities/ ž Division responsible for extension in Department of Fisheries and its service system have not yet been established. ž Size of operation by most livestock and fisheries producers is confined to small-scale, to whom technical support (in terms of resources management, hygiene management, processing techniques, storage/ preserving, marketing etc) is considered necessary.	ž Provision of technical dissemination program and re-training for extension staff ž Harnessing dissemination system at TS level	ž JICA carried out inhabitant's livelihood improvement project through dissemination of small-sized aquaculture techniques in Central Dry Zone. ž ACIAR plans to launch a project on rice, pulses, livestock, fisheries and extension activities. ž Myanmar Fishery Federation (MFF) has been established as a group in this industrial category.
【Research and Development】 ž The rate of agricultural research development sector to the entire private investment remains at very low level in the world, ž The least number of research staff among ASEAN members ž Though Fisheries Department carries out research on massive death of cultured fish, its success depends on improvement of researcher capacity, provision of research materials/ equipment. ž Requirement of research development on the control of pathogens etc	ž Establishment of research facilities, improvement of researcher capacity ž Exploitation of processing techniques of fisheries products	ž ACIAR plans to provide a research project selecting Livestock Breeding and Veterinary Department (LBVD) as targeted C/P. ž World Fish has initiated an inshore/ inland water fisheries research development project. Fisheries Department, Myanmar Fisheries Federation (MFF) and Yangon University are selected as C/P of this project .
【HRD】 ž Because of lack of higher educational organization specialized in fisheries, current staff of Department of Fisheries are graduates of University of Veterinary (measured in Zoology)	ž Exploitation of academic program on development of human resources in fisheries sector	ž Though the establishment of University of Fisheries has been approved in the diet (in 2013), it is not yet realized.

(4) Issues on Market Access

Myanmar Fisheries Federation intends to enhance boosting fisheries- export. The current exporting amount only has been reaching at10 % of the total catches from fisheries that are exported to China, Taiwan, Hong Kong, Japan, EU, USA. The remaining 90 % are usually/mainly marketed in dried form or fermented foods due to lack of cold-chain and immature processing techniques. In almost all cases, catches have been exported without processing, thus added value tends to be low. It needs to consolidate cold-chain and promote dissemination fisheries processing /storage techniques.

From a view point of marketing, marine catches are difficult to be brought into markets where specific size or specie is demanded since marine catches can hardly be controlled by specie or by size. The

following table shows the issues and measures on market access.

Table 8-19 Issues and Countermeasures on Market Access

Issues	Countermeasures	Current Activities
【Market Access】 ž In almost all cases, catches have been exported without processing. ž Processing/ storage techniques are still immature. Raw bonito is marketed without any treating such as blood-letting, leading to problem of emitting fish odor.	ž Development of/ brushing up research on fisheries processing/ storage techniques ž Promotion of disseminating fisheries processing/ storage techniques ž Enhancement of techniques related to hygienic management of fisheries products/ fisheries processing products, as well as quality inspection	ž Myanmar Fishery Products Processors and Exporters Association has been established as a group in this industrial category.
【Processing】 ž Low level of prices of fisheries products ž Due to lack of cold-chain and immature processing techniques, products are usually/ mainly marketed in dried form or fermented foods, thus added value tends to be low. ž In the case of in-shore fishery, a great deal of smaller size catches has been thrown away without significant utilization. ž Since marine catches can hardly be controlled by specie or by size, they are difficult to be brought into markets where specific size or specie is demanded. ž Supply-chain of fisheries products has not reached as far as consumption areas in plateau/ mountainous areas in the country.	ž Development and expansion of fisheries products value-chain ž Consolidation of cold-chain including refer-containers ž Formulation of strategic installation program of marketing infrastructure and its consolidation ž Exploitation and dissemination of methodology to effectively utilize small-sized catches as fertilizer, feeds etc	ž FAO is engaged in improving market access of fisheries products. ž Myanmar Fishery Products Processors and Exporters Association has been established as a group in this industrial category. ž JTF plans to implement monitoring of catches on residual chemical compounds and drug contents.

(5) Issues on Fund Access

Funding sources are very limited to fisheries activities. The following table shows the issues and conceivable measures on fund access based on the MFF's request.

Table 8-20 Issues and Countermeasures on Financial Access

Issues	Countermeasures	Current Activities
ž Because institutional funding sources accessible by small-holding farmers are very limited, 30 - 40 % of rural population depend on borrowing from informal money suppliers.	ž Exploitation of loan services for sale targeting small-holding farm households	ž MADB loans can be granted to those who are engaged in livestock and fisheries management according to MADB Act, but they are substantially granted only to those who are engaged in agricultural activities. ž Treasure Bank provides fund for fisheries activities. ž JICA is carrying out a study on agricultural funds

8.3 Issues on Market Oriented Agriculture and Market Economy

8.3.1 Public Private Partnership

There are many positive factors in Myanmar economic development including abundant agricultural labor, vast agricultural land, less polluted farmland, a wealth of water resources, diverse vegetation from plain area to mountainous area, positive invitation of foreign investment by the government,

NGOs activities in rural area.

It is expected that Myanmar will developed to a supply source of food to neighboring countries, through production increase and processing of agricultural products, and through active collaboration with ASEAN countries. To measure up to the expectations, coordination with foreign aid organization and private companies is necessary. Major issues on promoting market oriented agricultural production and public private partnership toward market economy are as follows.

a) Human resource development for farmers
b) Positive implementation of infrastructure development
c) Technical support on agriculture and food processing
d) Technical transfer to agriculture and food related industry

8.3.2 Role of Government and Necessary Support to Private Sector

Role of government under transaction economy is to support private sector through establishment of new land law and introduction of exchange quotation for example, which are important factors to improve investment climate. In addition, following measures are required to the government to support private sectors.

a) Improvement of financial system of MADB and other financial institutes so that small farmers can easily access to credit for farming
b) Development of farm-to-market road and small-scale irrigation facilities to increase agricultural production
c) Accurate agricultural statistics to promote agriculture sector improvement
d) Impartial and sustainable distribution and utilization of land resources to stakeholders including small farmers and large enterprise
e) Supporting measures to small farmers who cannot cope with rapid price change and market trend
f) Improvement of extension and dissemination measures of seeds, fertilizers and pesticides to increase agricultural production
g) Bargaining power of farmers is quite weak and they have to pay high transaction cost due to lack of technologies and know-how, and access to credit. Improvement of supply chain of agricultural commodities is important. Main actor in the supply chain is private sector, but government support is needed.
h) Constraints on export of agricultural products includes; a) it is not sure whether government put importance on quality improvement or production increase, b) value chain issues between producers and traders regarding to price formulation, in addition to tax system to exporters
i) Quality of products and food safety issue are important factor to make fair price and access to market. FOB price of 25% broken rice in Myanmar is lower than FOB price of Thai's and Vietnam's rice. Therefore, most rice from Myanmar is exported to limited countries sch as South-west Asia and African countries. Since volume increase of rice is more important in

Myanmar than quality improvement, host-harvest facility is not well developed, and Myanmar rice cannot meet international demand for rice.

Table 8-21 Issues and Countermeasures on Investment Promotion and PPP

Issues	Countermeasures	Current Activities
【Investment Promotion】 ž The rate of agricultural sector to the entire private investment remains at poor level, only 0.02% in the case of domestic enterprises and 0.43% from foreign ones.	ž Active consolidation of agricultural infrastructure ž Technical cooperation on food processing ž Technical transfer on food-related industries (machinery operation etc)	ž GIZ is supporting small- and medium scale enterprises
【PPP】 ž Policy for investment promotion has not yet formulated, thus roles to be played by official and private sides are yet ambiguous. ž For rice, investment on infrastructure covering from post-harvest treatment facilities to port operation ones has not yet progressed. ž Institutions of exports/ imports are not clear, with frequent amendments. ž Investment risk remains at high level due to unclear investment institution, frequent modification, and lack of crop insurance scheme ž Since leakage as unauthorized seeds happens, thus intellectual property right has not yet been protected, market participation by overseas seed sellers accompanies with high risk	ž Promotion of consolidating basic infrastructure on the exports of farm products ž Implementation of measures for reducing investment risk such as application of crop insurance ž Adequate solutions to cope with the issues of intellectual property right	ž Private commercial associations belonging to the category of MOC have supported private investment.

8.4 Rural Development and Poverty Alleviation

8.4.1 Economic Gap between Rural Areas and Urban Areas[79]

Myanmar is one of the poorest countries in Southeast Asia. A resent shows that the poverty head count index declined 32 % index between 2005 and 2010 but the overall incidence of poverty is still very high. Poverty incidence is around twice as high in rural than urban areas, with the result that rural areas account for almost 85% of the poverty. Although poverty incidence for Chin, Rokhine and Shan are the highest, absolute numbers of poverty households are in Ayeyarwady (19%) and Mandalay (15%) due to their high population.

Accordingly, Government of Myanmar has paid the highest attention to poverty alleviation from its very inception. One month after the inauguration of the government, it organized a first ever national workshop on Rural Development and Poverty Alleviation (May 2011). The workshop laid down eight fundamental tasks for various ministries and state organs to address poverty alleviation. In July 2011, the government mandated a central and various subcommittees to focus on the eight tasks.

8.4.2 Supporting Small-Holding Farmers[80]

Issues for supporting small-holding farmers are summarized as follows;

[79] Framework for Economic and Social Reforms,2012, P10-11
[80] Agriculture Development Issues and Strategies, Myanmar 2011, P49-52

- Fund access to small-holding farmers is very limited for large-scale investment in agriculture.
- All lands in Myanmar are owned by the State and cultivators have only the tilling rights. Most farmers have only land as their main asset, but their inability to use land as collateral for bank loans has made it difficult for them to access formal credit with lower interest rate. Myanmar Agricultural Development Bank (MADB) is the only source of institutional for crop cultivation. The rice farmers have been given top priority and about 80 % of total loans are given to the rice farmers alone, while the remaining 20 % had to be divided among farmers growing oilseeds, pulses, cotton and culinary crops. MADB's bank loan covers less than 50 % of production cost. MADB is managing the bank fund relying on the Central Bank of Myanmar. The annual loan rate for farmers is 8.5%. MADB is required to contribute 75 % of its net income to the government and just the remaining 25 % is kept as reserve fund. It indicates that MADB is not the profit making bank and has to totally rely on CBM loan.
- The seasonal loans must be repaid within one cropping season, and the loan size is not adequate for farmers to repay on MADB alone. Thus farmers have to borrow from informal money lenders with high rates ranging 5 to 20 % per month.
- MADB has not the system and procedure for disturbing loans to landless and poorest segments of the rural society. Most of farmers have to rely on microfinance managed by NGO.
- Private players called as Myanmar Rice Specialized Companies (MRSC) emerge to help the farmers by providing farm credit and such inputs as seeds and fertilizers and their coverage is rather small to fulfill the needs of the whole country.

8.4.3 Support to Landless Farmers (Agricultural Labor)[81]

Poverty is frequently associated with landless farmers. Indeed, landlessness is to problem facing 24 % of those whose primary economic activity is agriculture. According to the survey cited above (IHLCS 2010), land ownership status and size directly correlates with the escape from the poverty, demonstrating the significant contribution of asset ownership towards poverty reduction. Landlessness has been a chronic problem in the agricultural sector and there has been very little improvement in this aspect since 2005 when the rate was 26 %.

In fact, the problem increased in the very poorest group of rural households from 34 % in 2005 to 38 % in 2010; therefore, it represents a major causal factor for rural poverty. In terms of regional profile, the highest rates of landlessness are found in Bago (41%), Yangon (39%) and Ayeyarwady (33%), the three most agriculturally important regions collectively known as" rice bowl of Myanmar" where more of the country's stable crop is grown than in the rest of the country together.

Considering the above situations, the following measures are going to be taken for overcome issues.

(1) Land reform is central to rural development and essential for inclusive growth.

Towards this end, the Parliament has recently enacted the Farm Land Law as well as the Vacant,

[81] Framework for Economic ans Social Reforms,2012, P12-13

Fallow and Virgin Land Management Law in March 2012. Although the laws allow long-term use of large tracts of land for private investors in agricultural, industrial and contract farming practices, it requires further adjustments in protecting land rights to small holders and poor farmers. While the parliament has formed on inquiry commission to investigate the impact of new land laws on rural households, the government has also looked into overhauling the land use policy.

(2) Improvement of Access to Credit

In rural areas, credit access is also crucial for agricultural households to escape from poverty and increase productivity. Throughout the country, poor access to credit has been a binding constrains on agricultural growth. Debt levels of poor households are still very high, being 14 % of the total annual rice consumption expenditure.

(3) To increase the job opportunities for agricultural labor force

The primary problems are low remuneration and poor returns for those who do not participate and the seasonality of the jobs available to members of poor communities. Because of this situation, migration has historically been a source of opportunities for Myanmar people. However, migration has also caused major socio-economic problems.

The following table shows the issues and measures on poverty alleviation.

Table 8-22 Issues and Countermeasures on Poverty Alleviation

Issues	Countermeasures	Current Activities
ž Legal protection of land usufruct right for small-holding farm households and for those who are poverty stricken is required. ž Indebted level of poor families is maintained at a high level, and they hold debt amount equivalent to 14% of annual household expenditure. ž Since farm laborers receive low rate of return and their employment is seasonally limited, they can hardly obtain stable income.	ž Elaboration of protective measures for land usufruct right applicable to small-holding farm households and poverty stricken ones ž Improving off-farm income and leveling of farm laborer's income by creating hiring opportunities	ž Assistance in remote areas (CDRT) by UNDP was completed in 2012. ž WFP supports community infrastructure development in rural area ž MOLFRD develops Strategic Framework for Rural Development ž Many NGOs are developing their activities aiming at food procurement and income improvement in poverty prone areas.

Annex

Policies & Issues of Agricultural Sector in Myanmar

Policies & Issues of Agricultural Sector in Myanmar

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
1. Improvement in agricultural productivity	1.1 Introduction of high yielding varieties and quality seeds	ž Quality of rice seeds is mostly poor and supply of quality seeds remains only about 10% of the required quantity. ž Markets of rice seed have not yet been modernized. ž Price level of rice is too low to deserve using quality seeds. ž Vulnerable quality management system including appraisal of seed harvesting plots ž Diffusion of approved quality seed has been hampered by illegal imports of low quality seeds from borders of China /Thailand. ž Pulse seeds, 90% of which are self-harvested from individual farmers' plots in major producing area, Central dry Zone, consist of different varieties as admixture. ž Supply programs of quality seeds have not implemented so as to meet state of farming by individual farmers. ž Short of human resources for extension activities who instruct quality control of quality seeds ž Though Seed Act has been in force since 2012 by the assistance of FAO, its executive regulations have not yet established. ž Seed policy has not yet formulated.	ž Provision of the strategy for diffusing quality seeds in conformity with ecological farming environment / state of farming ž Strengthening system of developing, selecting, producing and diffusing high- quality varieties and achieving low-cost for their production ž Improved techniques for quality control (appraisal of seed-farm-plots etc) in producing seeds ž Modernization / consolidation of rice markets ž Provision of low interest farming loans ž Strengthened control system of importing goods at the frontier borders ž Protection of New Crop Varieties and promotion of investment to seed companies in the private sector ž Fortified instructive/ useful extension activities on seed management at farm-plot level ž Establishment of executive regulations of the Seed Act ž Formulation of seed policies	ž Seeds have been produced by DAR（rice, maize and other cereal seeds, oil seeds, seeds of pulses etc）, by DOA (rice, maize and other cereal seeds, oil seeds, seeds of pulses, vegetables etc) and by DICD (seeds of cotton, rubber, oil-palm, sugarcane etc). ž Seed policy has been supported by FAO, ADBI etc. ž IRRI has been assisted for introducing quality rice seeds. ž FAO as well as NGOs have assisted by donating seeds and providing means of multiplying them. ž Seed companies of private sector (major 6 enterprises) have been producing seeds of rice, maize and vegetables. ž In local areas, associations of rice-millers have been producing rice seeds. ž JICA has been implementing a project for multiplication and quality improvement of rice seed. ž ICA has been conducting a study on the application of low-interest loans for farming.	ž Formulation of seed policy ž Protection of breeder's right on the developed quality seeds ž Improvement in the degree of genetic purity of Breeder's Seed ž Strengthening instructive extension activities on seed control/management at farm-plot level (especially for rice, oil seeds and pulses) ž Formulation of extension policy for diffusing quality seeds
	1.2 Farm inputs	ž Level of utilizing farm inputs in Myanmar is extremely low among South-East Asian countries, thus resulting in low farm productivity. ž (Quality control on marketed agricultural chemicals and fertilizers has not effectively been practiced. Above all, inspection/ control system at the border front has not been consolidated.) Difficulty confronted by farmers arises from accessibility of funds for purchasing fertilizers.	ž (Improved agricultural extension services and assisting systems for distributing affordable seeds and fertilizers) ž Strengthening the system of controlling fake/ poor chemical fertilizers (especially for rejecting low-quality chemical fertilizers from China) ž Consolidation/ improvement of laboratory for fertilizer inspection under Agricultural Department ž Improved access to funds for small holding farm households ž Promotion of producing chemical fertilizers by utilizing natural gas	ž Fertilizers have been donated from FAO and NGOs. ž Ministry of Energy is responsible for allocating natural gas to chemical fertilizer production activities. ž Myanmar Fertilizer Seed and Pesticide Entrepreneurs Association represents the industrial group concerned. ž TPA is testing the application of a recycle-type farming model in a JICA partner project.	ž Technical exploitation and diffusion at low cost making use of micro-organism inputs

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
			ž Technical exploitation and diffusion at low cost making use of micro-organism inputs etc		
	1.3 Farm mechanization	ž Farmland size is averaged at as narrow as 2.4ha/farm-household, and the plots are not yet consolidated into machinery operable blocks, still remaining narrow access roads, thus utilization of large-sized farm machinery has hardly been promoted. ž Difficult access to farming loans for purchasing farm machinery ž Group-purchasing of farm machinery or joint use of machinery among group members has not promoted due to reluctance of group activities. ž Dilapidation of farm machinery and resulted frequent mechanical troubles at AMD Tractor Station ž In AMD Farm-Mechanization Training Center, repair of dilapidated farm machinery and provision of bran-new machinery for training can hardly realized owing to insufficient management budgets. ž Because markets of machinery and those of spare-parts are insulated and sellers of machinery do not take responsibility for supplying / procuring spare-parts, it takes much time to obtain spare parts.	ž Consolidation of farm plots into adequate blocks for mechanization, improvement of access farm-roads ž Improved access to farming loans by small-holder farmers ž Acceleration of farm mechanization through MFA（Myanmar Farmers Association）and RSC（Rice Specialization Companies）etc ž Renovation of materials and facilities in AMD Tractor Station /AMD Farm-Mechanization Training Center ž Up-dated training program in AMD Farm-Mechanization Training Center (on scientific basal techniques, coping with newly developed types of farm machinery, manual for repairing etc) ž Attaching duty of supplying spare-parts to machinery sellers (during the period of contracted maintenance duty)	ž Farm machinery has been procured by imports, and also produced by MOAI and private sector enterprises. ž MOAI, AMD has promoted farmland reclamation, farmland consolidation, accelerated farm mechanization, production of farm machinery, provided training on the use of machinery, but these activities have been confined to rice paddy cultivation. ž JICA provided cultivating machines while FAO・KOICA and JICA donated machinery for post-harvest operation. ž A project including farm-block consolidation has been implemented by the assistance of IFAD, KOICA and JICA.	ž No assistance has been provided on research development in terms of post-harvest treatment techniques (in particular those for oil-seeds/ pulses, vegetables and fruits). ž Up-dated provision of training materials and training programs in AMD Farm-Mechanization Training Center ((on scientific basal techniques, coping with newly developed types of farm machinery, manual for repairing etc) ž Exploiting loan-applicable farm machinery merchandise
	1.4 Promotion of irrigated farming	ž ID has expended over 50% of the total annual budget of NOAI, however, irrigation has covered only 17.1% of the total arable land in Myanmar and this rate is inferior to that of neighboring countries such as Thailand (27%), Viet-Nam (32%), India (34%) and China (47%). ž Dilapidated/ deteriorated irrigation facilities ž Some projects are not completed due to short construction budget for major/branch canal networks, or to delay behind construction schedule attributable to dispute on the compensation for land acquisition. ž Extension activities and instruction on the effective use of irrigation water is still insufficient. Farmer's training on water management at terminal plot level and	ž Construction of irrigation facilities and rehabilitation of dilapidated ones ž Institutionalization of irrigation consolidation program in the form of farmer's participatory projects, appointment of officers in charge of social consideration to ID ž Elaboration of legal-compensatory system in terms of land acquisition ž Regular, recurrent provision of farmer's training on effective use of irrigation water.	ž WB, JICA, FAO and UNDP provide assistance for irrigation development ž JICA has provided technical development for water-saving farming in Central Dry Zone. ž NGOs（11groups）have been engaged in new construction/ rehabilitation of groundwater irrigation, water-saving irrigation and irrigation systems.	ž Construction / rehabilitation of irrigation facilities ž Provision of regular and recurrent farmer's training on effective use of irrigation water (including irrigation for vegetables and fruits)

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
		demonstration at exhibition plots are also short.			
2. Particular issues by crop	2.1 Rice	ž Low profitability of dry-season paddy (attributable to consumptive use of diesel oil for driving pumps and resulting high cost) ž Poor quality control on rice seed, and resulted high rate of broken seed grains due to mixed rice varieties with different sizes/ length of grain ž Since a large part of farm-inputs (chemical fertilizers, diesel fuel, farming machinery) has been relied on imports, input price level tends to be expensive. ž Fertilizer application rate per unit cultivated area remains at very low level in contrast with international standard. ž Compulsory paddy cultivation in the area where irrigation facilities have been completed	ž Improvement of production techniques ž Promotion of cultivation based on the comparative advantage such as crop profitability, and extension of basic knowledge for crop selection ž Improved and diffused quality control techniques on seed production ž Provision of low-interest farming loans ž Promotion of catch-crop cultivation such as pulses by water-saving irrigation ž Establishment of trade by setting reasonable purchasing prices in compliance with quality of paddy rice	ž MRF has strengthened value-chain of rice as a group of this trading market 7 Groups including Millers Association, Traders Association, Rice Producers Association, Farmers Association belong to this category. ž JICA is implementing a project for increasing the production of rice seed and for improving their quality.	ž Improvement of production techniques ž Provision/ diffusion of know-how required for shifting cultivation from rice to oil-seeds and pulses by means of water-saving cultivation techniques
	2.2 Oil-seeds	ž About 80% of farm households self-supply seeds of oil crops in Central Dry Zone, leading to the degradation of seed quality. ž Mixing of different color grains and residual agro-chemicals remain issues in exporting sesame from Myanmar. ž Groundnut is apt to be contaminated by such mold-derived toxic substances as aflatoxin. ž The domestic production of edible vegetative oil has not enough met domestic consumption and Myanmar annually imports around 200 thousand ton of palm oil.	ž Selection of suitable seeds and diffusion of seed management techniques ž Improved and diffused post-harvest treatment techniques including improved method of drying sesame seed in producing plots ž Promoting extension of techniques to reduce level of residual agrochemicals by such measures as application of comprehensive pests and diseases control measures, appropriate use of agro-chemicals, utilization of organic bio-agents ž Consolidation / provision of post-harvest treatment facilities including air-conditioned warehouses	ž FAO provided assistance for establishing an oil purification plant and related technical improvement project (completed in 2013) ž JICA schedules to assist production of oil-seeds in Central Dry Zone. ž As related groups of this domain, Myanmar Pulses, Beans & Sesame Seeds Merchants Association and Myanmar Edible Oil Dealers Association belong to this category.	ž Selection of pertinent seed and diffusion of suitable management techniques ž Improved and diffused post-harvest treatment techniques ž Extension of the techniques for reducing level of residual agro-chemicals including comprehensive pests and diseases control measures, appropriate use of agro-chemicals, utilization of organic bio-agents
	2.3 Pulses	ž Seed quality used by farmers has been degraded year after year. ž Moisture content of green-gram seed produced in Central Dry Zone tends to be higher. High moisture often fosters mold generation or the occurrence of pests during the period of transport by boat.	ž Regeneration of seeds ž Selection of appropriate seed grains and diffusion of seed management techniques ž Improved and diffused post-harvest treatment techniques ž Provision/ consolidation of post-harvest treatment	ž ACIAR and JICA plan to assist production of pulses in Central Dry Zone ž Myanmar Pulses, Beans & Sesame Seeds Merchants Association has been established as the group related in this field.	ž Selection of appropriate seed and extension of seed managing techniques ž Improved and disseminated post-harvest treatment techniques

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
		ž In recent years, outstanding quality degradation of pigeon pea has been observed (for example, immature seed, wrinkled epicarp, molded grain, colorless grain etc)	facilities equipped with driers or air-conditioners ž Provision of study/ research on wilting point in Central Dry Zone		
	2.4 Sugarcane	ž All the existing sugarcane mills have been privatized, however, their operation rate remains low as facilities are increasingly dilapidated. ž Electricity supply to sugar mills has been unstable.	ž Stabilization of electric supply	ž DICD is operating seed production and extension. ž "Myanmar Sugarcane and Sugar Related Products Merchants and Manufactures Association " represents private groups of this domain.	ž
	2.5 Natural rubber	ž Quality of natural rubber produced in Myanmar has been poor, spoiling its international dealer's image. Price level of domestically produced natural rubber remains lower level than average price of TOCOM by about US$100 - 200/t. ž Even though individual producers/ plantation strive for higher quality, purchasing price cannot reflect quality level by differential pricing due to the negative influence by poor quality products. ž Lack of consolidated quality control system ž Productivity of natural rubber has been low, with a unit yield of 750 kg/ha/annum, that is less than half of the yield level of other producing countries（1,680 - 1,900 kg/ha/annum）. ž 40 - 50% of rubber trees are as old as 50 - 60 years. It suggests necessity of replanting, but it is difficult to provide regeneration cost for small-holders.	ž Establishment of such quality control system is required in which public organization provides services of laboratorial test inspection and issues quality certificate for the inspected products. ž Improved post-harvest treatment techniques, Improved products quality ž Re-plantation of rubber forests ž Improvement of processing techniques	ž DICD is responsible for seed production and extension ž As related group in private sector, Myanmar Rubber Producers' Association has been established.	ž
	2.6 Cotton	ž Quality of domestically produced cotton is lowered due to admixtures mixed at the harvest of cotton-boll, such as leaves and branches, also by mixed impurities at packaging into bags and during transport. ž Moisture content serves one of the causes of degrading quality of product.	ž Improvement of harvesting skills and post-harvest treatment techniques, in particular necessity of improving cotton ginning machine ž Reduction of moisture content in the harvested cotton-boll mostly depends on state of handling products around the harvesting period, during which it is considered requiring rapid harvesting and appropriate transport/ storage.	ž ICD is responsible for seed production and extension ž Ministry of Industry takes charge of processing of cotton.	ž
3. Technical extension, strengthenin	3.1 Human resource development	ž Number of staff in the governmental agencies handling individual development issues, and their organizational, financial and institutional capacity are relatively	ž Formulation of development programs in which development strategies/ rank of priority is clearly elucidated.	ž JICA has dispatched an advisor of agriculture/ rural development to DAP for tackling for improving MOAI's capacity of planning, developing and adjusting/	ž Technical transfer on agricultural sector review and policy establishment

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
g of organizations	such as technocrats	insufficient as compared with the quantity of issues to be tackled. ž Few human resources are available who can cope with needs of markets and producers that are diversified and highly escalated. ž Materials available in educational / training facilities have become dilapidated or out of order.	ž Developed, up-dated human resource nurturing programs ž Nurturing human resources who can cope with needs of markets and producers that are diversified and highly escalated ž Up-dating and provision of educational / training materials –equipment and facilities	coordinating related activities. ž JICA is also planning a scheme of strengthening organizations for agricultural human resource development (as non-reimbursable grant aid project) and a related technical assistance project. ž ADB provides TA for administrative capacity of the government	ž Strengthening human resource development organizations
	3.2 Extension of agricultural techniques	ž Extension facility, equipment and staff are in short of needs in both quantitative and qualitative terms. For example, in Central Dry Zone, it is found that an agricultural extension staff deals with 4 Village Tract and 900 farm-households (as of 2007). ž Method and means of communicating with beneficiary farmers by the staff are not sufficient. ž Means of transport for extension staff is far from satisfaction. ž Such farm inputs as fertilizers and agricultural chemicals are not enough to meet the demand. ž Necessity of shifting orientating pattern from administration leading type to bottom-up one by farmer's initiative ž Necessity of providing extension services on basic managerial judgment	ž Renewal of extension facilities/ equipment matching with real needs of markets and supplier-producers ž Creation of extension system making effective use of available communication means such as cell phones ž Pertinent, increased supply of farm inputs (such as fertilizers) ž Introduction of crop cultivation system by which substantial yield level can be expected even with low leveled input application ž Provision of farming instruction (farm management) ž Development of human resources capable of suggesting diversified options to the beneficiary farmers ž Pragmatic application of Farmer-to-Farmer Extension system	ž ACIAR plans to launch research projects dealing with rice, pulses, animal husbandry, fisheries and socio-economic matters (extension) ž In the past, JICA implemented MOAI agricultural extension staff human resources development strengthening project (2009-11), and a study on area development plan for poverty reduction in Central Dry Zone （2006-10）. ž Agricultural producers' groups belonging to the category of UMFCCI and MRF are providing capacity building for farm producers ž A host of NGOs are engaged in capacity building for inhabitants.	ž Strengthened system of diffusing farming techniques/ farm management instructions ž Creation of extension system making effective use of available communication means such as cell phones
	3.3 Agricultural research development	ž The ratio of agricultural research cost to the productive farm output equivalent to US$100 in Myanmar is calculated at 0.06%, indicating an extremely low level as compared to Asian average, 0.41% or to the mean level for developing countries, 0.53%. ž The least number of research staff among ASEAN members (62 doctors, 224 masters as of 1008) ž Dilapidated research facilities/ equipment ž Above all, bio-technological research has been much behind the time without any experience / any budget provision, and the state of private sector is similar to that of public one.	ž Consolidation of research facilities ž Improved capacity of researchers ž Participation in staff training, engagement in collaborated research development with those in neighboring countries as a member of ASEAN ž Promotion and fortification of research development projects in conformity with needs of markets inside and outside of Myanmar (such as varieties, processing techniques, residual agro-chemicals etc) ž Creation of research system in line with diversified local development potential in different areas	ž ACIAR plans to launch research projects dealing with rice, pulses, animal husbandry, fisheries and agricultural extension ž JICA schedules to implement a plan for strengthening organization developing human resources (on non-reimbursable fund basis). Also, it launches a project targeting to DAR and DOA on quality seed multiplication as well on water-saving farming techniques development ž In terms of research development, activities, few activities have been provided in the sub-sector of farm mechanization, creation of value added to farm	ž Consolidation of research facilities ž Improved capacity of researchers ž Promotion/ strengthening research development projects in response to needs arising from markets in and out of Myanmar (processing techniques, quality control etc)

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
		ž Lack of research system in response to diversified locality		produce. ž USAID has a plan to assess issues on starvation and poverty alleviation with MDRI. ž India establish ACARE to transfer technology to agri-related scientists	
4. Improved market access	4.1 Improvement in market value addition	ž Most pulses have been exported without value-addition by processing ž Short processing techniques and information thereon ž Under-developed processing industries, exploitation of processed foods have not so much been progressed.	ž Nurturing farm-products processing industry, introduction of subsidy policies on processing ž Sorting by size of products, fractioning by color of products, introduction of processing machinery such as pealing machine ž Strengthening development/ training/ extension of post-harvest treatment techniques (such as modernization of processing equipment, employment of new staff, up-dating of training program)	ž Agro-processing has mainly been put under the jurisdiction of Ministry of Commerce and that of Industry (Ministry of Industry is responsible for the approval of establishing food processing enterprises) ž Private groups belonging to the line of Ministry of Commerce mainly assist enterprises for value addition. ž FAO provided assistance for improving quality inspection techniques to be applied to edible vegetable oil (completed in 2013). ž Few NGOs have assisted improvement of value addition.	ž Fortification of developing, training and extending post-harvest treatment techniques (including modernization of processing equipment, employment of new staff, up-dating of training program etc)
	4.2 Post-harvest treatment	ž Due to lack of available post-harvest treatment/ storage facilities, harvested paddy is often left on paddy field for a long time, leading to higher damage such as crack of un-husked grains, eventually resulting in 10 - 20% post-harvest loss. ž High ratio of broken rice is found in many rice-mills, thus quality problem of rice often arises. ž Although a few modern rice-mills have been constructed, they are often left in a state of idling, thereby lowering operation rate of milling machines. ž Low rate of progress of streamlining post-harvest treatment facilities has led to high rate of marketing loss of perishable vegetables/ fruits. ž In the areas where farmers ought to use diesel mounted milling machines on account of lack of electricity supply, higher milling cost often results, thus affecting their farm management economy.	ž Consolidation of post-harvest treatment facilities for rice paddy including warehouses/depots and threshers ž Modernization of rice milling techniques ž Creation of post-harvest treatment facilities for agro-perishables (such cold-chain elements as lot-collecting points and (pre-)cooling houses) ž Improved packaging techniques for agro-perishables ž Essential development of consistent policies, institutions and technical extension covering from production to post-harvest treatment so as to realize quality control/ cost reduction (coordinated promotion by both MOAI and MOC).	ž Target of post-harvest treatment assisted by AMD is mainly rice-paddy. ž Quality inspection / training has been provided by PTAC under the umbrella of MOC, however, its training activities remains inert (almost no development has been made in the field of post-harvest treatment techniques). ž Assistance on post-harvest treatment has been carried out by JICA (through grass-root aid program), UNDP and LIFT. ž KOICA is constructing a training facility for post-harvest treatment targeting rice and such fruits as mango.	ž Consolidation of post-harvest treatment facilities for rice paddy including warehouses/depots and threshers ž Modernization of rice milling techniques ž Consolidation of post-harvest treatment facilities for agro-perishables (such cold-chain elements as lot-collecting points and (pre-)cooling houses)
	4.3 Marketing /	ž Lack of effective marketing infrastructure	ž Strengthened imports control system for imported	ž MOAI issues license document for importing	ž Strengthened imports control

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
	markets	ž Efforts of improving quality of marketed goods are not remuneratively reflected into their prices. Chinese dealers do not give higher value to high quality goods, thus they never make farmers any incentive. ž Due to lack of decent maintenance, feeder roads become muddy with the onset of rainy season, often leading to higher transportation cost, serving as hindrance / obstacle of transporting farm produce. ž In some cases, lading cost of farm produce from harvesting areas to Yangon port happens to become higher amount than purchasing price of farm products ž Inspection system for residual agro-chemicals etc is not yet developed responding to quality level demanded in the international market. ž Supporting measures applicable to small-holding farmers who cannot cope with rapid price fluctuation of farm products and quickly changing market trends.	agro-chemicals, fertilizers etc at border fronts ž Support for consolidation at hard-ware side including farm roads, warehouses, means of transportation, electricity supply etc, along with that for improvement at soft-ware side including market intelligence ž Harnessing quality control inspection system targeting residual agro-chemicals etc and improvement of post-harvest treatment techniques	agro-chemicals/ fertilizers, while MOC takes charge of controlling exports/ imports. DOA is responsible for quarantine at border front and international airports. ž MOAI（DAP）and MOC（DTP）supply information on market intelligence and private associations belonging to the category of MOC provide it for their members. ž Foods have been inspected by MOAI(DOA), MOC (PTAC) and Ministry of Health (FDA) and similar inspections are also provided by the private sector including chamber of commerce (MFPEA), SGS and OMIC. ž GIZ is strengthening value-chain of mango and tea in Shan Province as a series of assistance for small- and medium scale enterprises. ž USAID carried out a study on the fortification of value-chain targeting farm products.	system for imported agro-chemicals, fertilizers etc at the borders of the state ž Support for consolidation of marketing infrastructure including farm roads and warehouses ž Fortification of quality control inspection system targeting residual agro-chemicals etc and improvement of post-harvest treatment techniques
	4.4 Export promotion	ž Supply of market intelligence is confined to one-way flow from influential dealers, and Chinese dealers have played role of Price Maker in the field of frontier trade. ž Lading cost at Yangon port is notoriously expensive, universally known as an inefficient port. Loading/ unloading operations are quite often congested and stagnated due to dilapidation of port operating facilities and limited capacity of lading/ unlading, not only leading to higher demurrage rate but also to affecting rice quality. ž On account of lack of consolidated post-harvesting treatment facilities, importance has been more attached to quantity than quality of rice, eventually entailing to Myanmar's weaker competitiveness by lower quality rice exports in international market, thus failing to meet diversified international demand for rice.	ž Formulation of strategic configuration program for marketing infrastructure and improvement thereof in line with the formulated plan ž Modernized streamlining of port operation facilities and improvement on the operational capacity of lading/ unlading ž Development and diffusion of post-harvest treatment / processing facilities in compliance with current needs of international market (harnessing international competitiveness) ž Creation of a system/ technical diffusion for the purpose of harnessing international competitiveness of the value-chain as a whole covering from rice production to post-harvest treatment	ž Trade promotion department of MOC provides assistance for export promotion. ž Also, private commercial associations belonging to the category of MOC have provided various supports on trade promotion. ž Ministry of Transport takes charge of consolidation of port operation facilities.	ž Creation of a system/ technical diffusion in order to enhance international competitiveness of the value-chain as a whole covering from rice production to post-harvest treatment
5. Improvement on access to	5.1 Improvement on access to fund/ loans	ž Loan amount has been confined to certain degree due to insufficient fund provision and limited organizational capacity of funding agencies, for example, only 30 - 40%	ž Improved fund institutions matching farmers needs ž Since many banks other than MADB target urban population, development of fund-mediating institutions is	ž UNDP and LIFT have provided micro-finance coupling with NGOs (including PACT, World Vision etc). ž JICA is studying agricultural funds.	ž

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
fund/ loans		of the rice production cost is actually granted to an applicant farmer. ž Cooperative organizing rate remains at low level that constitutes a condition of acquiring loans by Ministry of Cooperatives. ž Because institutional funds accessible by farmers are limited and their grant amounts are not enough, 30 - 40% of rural population depend on loans supplied by informal money lenders. ž About 80% of the loan amount granted from MADB are concentrated on rice producing farm households, thus it is too difficult for farmers who produce vegetables and fruits to acquire loans from this source. ž Many cases of difficulty in repayment arise from weather vagary.	essential that can serve population in rural areas. ž MAPCO has started a study on crop insurance such as weather index insurance, and such support towards institutionalization is necessary.	ž 118 groups have been listed as licensed MFI (NGOs, cooperatives etc), however, they have been able to provide only about 30% of the total demand for fund.	
6. Investment promotion	6.1 Investment promotion	ž Policy for investment promotion has not yet formulated, thus roles to be played by official and private sides are yet ambiguous. ž For rice, investment on infrastructure covering from post-harvest treatment facilities to port operation ones has not yet progressed. ž Institutions of exports/ imports are not clear, with frequent amendments. ž Investment risk remains at high level due to unclear investment institution, frequent modification, and lack of crop insurance scheme ž Since leakage as unauthorized seeds happens, thus intellectual property right has not yet been protected, market participation by overseas seed sellers accompanies with high risk	ž Promotion of consolidating basic infrastructure on the exports of farm products ž Implementation of measures for reducing investment risk such as application of crop insurance ž Adequate solutions to cope with the issues of intellectual property right	ž Private commercial associations belonging to the category of MOC have supported private investment.	ž Application of measures on the reduction of investment risk such as crop insurance institutions ž Measures to cope with the issue of intellectual property right
	6.2 Coordination between public and private sectors	ž The rate of agricultural sector to the entire private investment remains at poor level, only 0.02% in the case of domestic enterprises and 0.43% from foreign ones.	ž Active consolidation of agricultural infrastructure ž Technical cooperation on food processing ž Technical transfer on food-related industries (machinery operation etc)	ž GIZ is supporting small- and medium scale enterprises	ž
7. Agricultural	7.1 Qualification of	ž Figures in agricultural statistics are incorrect/ inaccurate	ž Putting statistical information in good order	ž "Myanmar Census of Agriculture 2011" was issued	ž Enrichment of statistical

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
statistics	Agricultural statistics	ž Insufficient data management system in TS offices etc	ž Reorganization of information management system in regional offices	from MOAI by the assistance of FAO (March 2013)	information
8. Poverty reduction	8.1 Poverty reduction	ž Legal protection of land usufruct right for small-holding farm households and for those who are poverty stricken is required. ž Indebted level of poor families is maintained at a high level, and they hold debt amount equivalent to 14% of annual household expenditure. ž Since farm laborers receive low rate of return and their employment is seasonally limited, they can hardly obtain stable income.	ž Elaboration of protective measures for land usufruct right applicable to small-holding farm households and poverty stricken ones ž Improving off-farm income and leveling of farm laborer's income by creating hiring opportunities	ž Assistance in remote areas (CDRT) by UNDP was completed in 2012. ž WFP supports community infrastructure development in rural area ž MOLFRD develops Strategic Framework for Rural Development ž Many NGOs are developing their activities aiming at food procurement and income improvement in poverty prone areas.	ž Creating employment opportunities so as to improve off-farm income and to level farm laborer's income
	8.2 Farmer's organization	ž Very few farmers' organizations are engaged in such intensive activities as extending farming techniques, joint marketing of farm produce, joint purchase of farm inputs etc, or they are not functioning well. ž Very few Water User's Association (WUA) have been established that manage irrigation water at terminal beneficiary level, or they are not functioning well.	ž Clarification of role to be played by farmers' organizations in the fields of agricultural development / poverty reduction ž Provision of appropriate support/ services for farmers' organizations ž Promotion/ solicitation for establishing autonomous farmer's cooperative in which related government agencies refrain from taking initiative of organizing it.	ž Ministry of Cooperatives is taking measures to strengthen Cooperative Society. ž Informal farmers' organizations have been organized through the support by NGOs etc.	ž Clarification of role played by farmers' organizations in agricultural development and poverty reduction ž Provision of appropriate support/ services for farmers' organizations

Policies & Issues of Livestock Sector in Myanmar

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
1. Improvement in livestock productivity	1.1 Improvement in agricultural productivity	ž No strategic development plan is available in livestock sector ž Deterioration of breeding-stock for reproduction ž Since artificial insemination (A.I.) service has been provided to commercial facilities in Yangon and Mandalay, it is difficult for farmers to have access to A.I. ž Draught cattle are mainly kept in rural areas, while production of beef cattle remains behind the time. ž Many farm households inherit traditional way of rearing livestock from parents/ relatives to sons/ daughters, so their scientific knowledge is poor. ž Supply of feeds containing poor nutritional ingredient	ž Formulation of development plan in which development strategy and relative priority are made clear ž Enhancement of extension service of A.I. to rural areas ž Nurturing private farms specialized in beef cattle or dairy cattle ž Extension/ fortification of feeding techniques based on scientific knowledge (nutritional improvement, hygienic management, feeding, reproductive management, prevention of contagious diseases etc) ž Increase nutrition value of coarse feed and development of feed supply-chain through the coordination between rice millers and oil extractors	ž DFID, TICA (dealing buffaloes), JICA etc have supported in livestock sub-sector. ž FAO implemented a dairy varieties improvement project (2008 - 2009) in the past. ž Japan Livestock Techniques Association (JLTA) has implemented a livestock development project (2009 - 2010) in Amarapura TS (Mandalay). ž Various private groups have been established covering feeds, buffaloes (Mythum), dairy, layer's eggs, bovine, sheep and goats.	ž Technical transfer on the method of formulating Livestock Development Master Plan. ž Development of A.I. techniques and improvement of experimental facility and methodology of A.I. (including itinerant , shifting A.I. service) ž Extension/ fortification of feeding techniques based on scientific knowledge (nutritional improvement, hygienic management, feeding, reproductive management, prevention of epidemic diseases etc)
	1.2 Management of livestock health/ diseases	ž Prevalence of such epidemic livestock diseases as foot-and mouth-disease (FMD) ž Occurrence of new type livestock diseases by trans-border migration of live animals including bird influenza, virus-origin Porcine Respiratory and Reproductive Syndrome ž Occurrence of trans-border livestock diseases by trans-border migration of live animals and livestock products, including bird influenza, virus-origin Porcine Respiratory and Reproductive Syndrome	ž Diffusion of knowledge on contagious diseases to livestock holder farmers and strengthening monitoring system as well as diseases diagnostic techniques on serious occurrence of epidemic diseases at TS level ž Formulation and implementation of effective vaccine production as well as vaccination programs ž Deployment of supplying points of animal hygiene / veterinary service ž Deployment of check-point sites in airports and along state borders ž Development and dissemination of bio-security technology	ž LBVD provides quarantine service at 15 sites including border front ž JICA dispatched the advisor for Livestock Promotion in Central Dry Zone to Mandalay where it also plans to implement a pilot project. ž New Zealand and TICA implemented support for coping measures with livestock diseases.	ž Dissemination of knowledge on livestock contagious diseases among livestock holding farmers ž Fortification of livestock diseases diagnostic techniques on serious occurrence of epidemic diseases at TS level ž Formulation and implementation of effective vaccine production as well as vaccination programs ž Deployment of servicing spots of animal hygiene / veterinary service
2. Resource management	2.1 Sustainable use of natural resources	ž	ž	ž MOLF carried out development of feed-grass pastures ž ADB is implementing a project on the sustainable use of natural resources	ž

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
3. Technical dissemination	3.1 Technical dissemination	ž Insufficient human resources and budget amount for carrying out extension activities. According to a calculation, LBVD staff stationed at TS level has to cover 16 TS per staff and 3,600 farmers in Central Dry Zone (as of 2007). ž Short technical dissemination and enlightening education toward small holding and medium scale farm households in rural areas ž Most people engaged in animal husbandry and fisheries have small sized activities to whom technical support (livestock feeding management, animal hygiene management, product harvesting techniques, storage/ preserving, marketing etc) is essential.	ž Strengthened extension system at TS level ž Updated contents of technical dissemination and extension program, re-education toward extension staff ž Exploitation of livestock product processing techniques	ž ACIAR schedules to launch a research project covering rice, pulses, livestock, fisheries and extension Ž MLF is a group belonging to this category.	ž Exploitation of livestock product processing techniques
	3.2 Research development	ž The rate of investment to agricultural research sector remains at one of the lowest level in the world. ž Least numbers of researchers among ASEAN countries ž Advanced aging of researchers, dilapidation of research facilities/ equipment	ž Progress and improvement of epidemiology and inspection techniques ž Exploitation and diffusion of vaccines/ preventive drugs ž Nurturing younger researchers, up-dating of research facilities and equipment	ž ACIAR plans to carry out a research project in livestock sector selecting LBVD as C/P of the project.	ž Progress and improvement of epidemiology and inspection techniques
	3.3 Human resources development	ž Insufficient human resources who create development strategies, formulate livestock policies ž University of veterinary that is a source of creating human resources in this sector has attached biased-importance on veterinary, resulting in a shortage of educational program in livestock/ management sector	ž Development of official's capacity to formulate policies ž Expansion of curricula on livestock management/ production in University of Veterinary	ž JICA dispatches an advisor to Mandalay for promoting livestock production in Central Dry Zone	ž Development of official's capacity to formulate policies ž Expansion of curricula on livestock management/ production in University of Veterinary
4. Improvement of market access	4.1 Marketing	ž Because cold-chain is still under-developed in Myanmar, problem arise from hygienic management of products ž Since almost no slaughterhouse is found in Myanmar, hygienic management is not enough developed.	ž Promotion for constructing modern type slaughterhouses ž Establishment of hygienic management system for livestock products ž Consolidation of cold chain dealing with livestock products	ž MLF is a group belonging to this category. ž WSPA, an NGO provides support for decent slaughtering	ž Promotion of constructing modern type slaughterhouses ž Establishment of hygiene management system for livestock products ž Consolidation of cold chain dealing with livestock products
	4.2 Livestock product	ž System of treating / processing meats is under-developed	ž Development of livestock product processing techniques, diversification of dairy products	ž JICA is carrying out a study on agricultural funds. ž FAO carries out a support project for small-scale	ž Exploitation of livestock product processing techniques,

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
	processing	ž Though cheese and yoghurt have been processed in a part of Shan Province, condensed milk is only available as their processing material for processing dairy products because too few processed milk manufacturers are available who equipped with modern dairy processing facilities. ž Price levels of feeds are high, leading to higher manufacturing cost for dairy products ž Slaughtering of younger aged cattle has been banned by an Act (for prior use of cattle as draught purpose)	ž Development of livestock product processing industry, establishment of supporting institutions for this industry ž Introduction of high nutrition value feed and such storage skill as silage and haylage ž Mandalay-based Development, strengthening and nurturing of dairy value-chain	dairy farms. Also, it supports milk supply program to primary and secondary schools. ž India invited daily farmers and government staff for training	diversification of domestic dairy products ž Exploitation and dissemination of inexpensive and nutritious feeds ž Development and strengthening of dairy value-chain locating its base in Mandalay etc
	4.3 Export promotion	ž Entry of Myanmar into export markets for pork, frozen broiler and layers egg arises a problem of failing to meet overseas standards due to lack of consolidated meat treatment and processing system or owing to too small production scale. ž Expensive imported livestock medicines and feed additives	ž Abolition of imposing import taxes and trading tax on the imports of veterinary medicines and feed additives	ž Animal Products Exporters Association has been established as a group developing activities in this sector	ž
5. Improvement of fund access	5.1 Improvement of fund access	ž Because institutional funding sources accessible by small-holding farmers are very limited, 30 - 40 % of rural population depend on borrowing from informal money suppliers.	ž Exploitation of loan services for sale targeting small-holding farm households	ž MADB loans can be granted to those who are engaged in livestock and fisheries management according to MADB Act, but they are substantially granted only to those who are engaged in agricultural activities. ž Treasure Bank provides fund for livestock industry. ž JICA is conducting a study on agricultural funds ž LIFT-PACT carries out support by micro-credit.	ž Exploitation of loan services for sale targeting small-holding farm households
6.promotion of investment	6.1 Coordination between public and private sectors	ž The rate of agricultural sector investment to the entire private investment remains at poor level, only 0.72% in the case of domestic enterprises and 0.81% from foreign ones.	ž Subjective consolidation of related infrastructure ž Technical cooperation on food processing ž Technical transfer on food-related industries (machine operations etc)	ž Foreign private investment has been concentrated on feed production. ž As a national project, School Milk Project has been carried out in Yangon, Mandalay and Nay Pyi Taw.	ž
7.Statistics	7.1 Statistical information	ž Edition of census has interrupted since 1993-94, and after the interruption statistical data has been obtained only by multiplying the last data by growth rates, thus the resulted data are not correct. ž Insufficient data management system in data-files of TS offices	ž Resumption of livestock census by MOLF ž Reorganization of information management system in regional offices	ž	ž Improvement/ enrichment of statistic information

Policies & Issues of Fisheries Sector in Myanmar

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
1. Improvement in fisheries productivity	1.1 Improvement in fisheries productivity	ž Few strategic development plans in fisheries sector ž Yield level of aquaculture products is not so high as compared with period of culture. ž High cost of such input feed as fish meal and pellet serves as a limiting factor in terms of development and expansion of aquaculture activities as well as of competitiveness in foreign markets ž Low interest/ concern on product quality, hygienic management	ž Formulation of a development plan n which development strategy/ relative priority are clearly defined. ž Promotion of use of Laucen, Kena and rice bran as feed meal pellet ž Perfection of quality/ hygiene management, promotion of enlightening activities toward fishery population	ž FAO provided support in fisheries field ž KOICA is planning to launch a project on aqua-culture sector (F/S has been completed). ž Several groups have been established belonging to such operation form/ fishery products as marine fisheries, inland water fisheries, shrimp/prawn, crabs, eel, fish-feeds, ornamental fish etc. ž Several NGOs (CARE、GRET、SWISSAID) provide support for aquaculture activities	ž Technical transfer on the method of formulating a master-plan on fisheries development ž Perfection of quality/ hygiene management, promotion of enlightening activities toward fishery population
	1.2 Control of diseases	ž Occurrence of massive death of cultured fish	ž Dissemination of knowledge on contagious fish diseases to fisheries households ž Expansion of local diagnostic service on diseases of cultured fish	ž	ž Expansion of local diagnostic service on diseases of cultured fish
2. Resource management	2.1 Sustainable use of natural resources	ž Reduction of environmental resources has manifested attributable to random catches and degraded/ deteriorated growth environment along coastal parts. ž Though the sustainable level of catches from marine fisheries is estimated at one million t/on year, current level reaches 2 million ton /year, implying excessive catches.	ž Implementation of fisheries resources assessment ž Formulation of fisheries resources conservation program aiming at sustainable development of small-scale fisheries in in-shore areas and large-scale ones in off-shore areas ž Creation of monitoring system for preventing random/ exhaustive catches of fisheries resources (including demarcation of fishing prohibition area/ period, ban of catching cultured fish etc)	ž FAO carried out support for sustainable fisheries activities in mangrove forests. ž IFT with BOBLME is studying dolphins in Ayerwardy River ž IFT with BOBLME is studying Biomass in Bengal Bay	ž Implementation of fisheries resources assessment ž Creation of monitoring system for preventing random/ exhaustive catches of fisheries resources (including demarcation of fishing prohibition area/ period, ban of catching cultured fish etc)
3. Technical dissemination	3.1 Technical dissemination	ž Insufficient human resources and budget for disseminating activities/ ž Division responsible for extension in Department of Fisheries and its service system have not yet been established. ž Size of operation by most livestock and fisheries producers is confined to small-scale, to whom technical support (in terms of resources management, hygiene management, processing techniques, storage/ preserving, marketing etc) is considered necessary.	ž Provision of technical dissemination program and re-training for extension staff ž Harnessing dissemination system at TS level	ž JICA carried out inhabitant's livelihood improvement project through dissemination of small-sized aquaculture techniques in Central Dry Zone. ž ACIAR plans to launch a project on rice, pulses, livestock, fisheries and extension activities. ž Myanmar Fishery Federation（MFF）has been established as a group in this industrial category.	ž

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
	3.2 Research Development	ž The rate of agricultural research development sector to the entire private investment remains at very low level in the world, ž The least number of research staff among ASEAN members ž Though Fisheries Department carries out research on massive death of cultured fish, its success depends on improvement of researcher capacity, provision of research materials/ equipment. ž Requirement of research development on the control of pathogens etc	ž Establishment of research facilities, improvement of researcher capacity ž Exploitation of processing techniques of fisheries products	ž ACIAR plans to provide a research project selecting Livestock Breeding and Veterinary Department （LBVD） as targeted C/P. ž World Fish has initiated an inshore/ inland water fisheries research development project. Fisheries Department, Myanmar Fisheries Federation（MFF） and Yangon University are selected as C/P of this project .	ž Establishment of research facilities, improvement of researcher capacity ž Exploitation and improvement of processing techniques of fisheries products
	3.3 Human resources development	ž Because of lack of higher educational organization specialized in fisheries, current staff of Department of Fisheries are graduates of University of Veterinary (measured in Zoology)	ž Exploitation of academic program on development of human resources in fisheries sector	ž Though the establishment of University of Fisheries has been approved in the diet (in 2013), it is not yet realized.	ž Exploitation of academic program on development of human resources in fisheries sector
4. Improvement of market access	4.1 Processing	ž In almost all cases, catches have been exported without processing. ž Processing/ storage techniques are still immature. Raw bonito is marketed without any treating such as blood-letting, leading to problem of emitting fish odor.	ž Development of/ brushing up research on fisheries processing/ storage techniques ž Promotion of disseminating fisheries processing/ storage techniques ž Enhancement of techniques related to hygienic management of fisheries products/ fisheries processing products, as well as quality inspection	ž Myanmar Fishery Products Processors and Exporters Association has been established as a group in this industrial category.	ž Development of/ research on fisheries processing/ storage techniques and dissemination of the research results ž Enhancement of techniques related to hygienic management of fisheries products/ fisheries processing products, as well as quality inspection
	4.2 Marketing	ž Low level of prices of fisheries products ž Due to lack of cold-chain and immature processing techniques, products are usually/ mainly marketed in dried form or fermented foods, thus added value tends to be low. ž In the case of in-shore fishery, a great deal of smaller size catches has been thrown away without significant utilization. ž Since marine catches can hardly be controlled by specie or by size, they are difficult to be brought into markets where specific size or specie is demanded.	ž Development and expansion of fisheries products value-chain ž Consolidation of cold-chain including refer-containers ž Formulation of strategic installation program of marketing infrastructure and its consolidation ž Exploitation and dissemination of methodology to effectively utilize small-sized catches as fertilizer, feeds etc	ž FAO is engaged in improving market access of fisheries products. ž Myanmar Fishery Products Processors and Exporters Association has been established as a group in this industrial category. ž JTF plans to implement monitoring of catches on residual chemical compounds and drug contents.	ž Development and expansion of fisheries products value-chain （starting at landing sites）

Major policy category	Issues to be tackled		Conceivable measures	Current activities by the Government, donors and private sector	Major counter-measures
		ž Supply-chain of fisheries products has not reached as far as consumption areas in plateau/ mountainous areas in the country.			
5. Improvement of fund access	5.1 Improvement of fund access	ž Because institutional funding sources accessible by small-holding farmers are very limited, 30 - 40 % of rural population depend on borrowing from informal money suppliers.	ž Exploitation of loan services for sale targeting small-holding farm households	ž MADB loans can be granted to those who are engaged in livestock and fisheries management according to MADB Act, but they are substantially granted only to those who are engaged in agricultural activities. ž Treasure Bank provides fund for fisheries activities. ž JICA is carrying out a study on agricultural funds	ž Exploitation of loan granting services for sale, targeting small-holding farm households
6.promotion of investment	6.1 Coordination between public and private sectors	ž The rate of agricultural sector investment to the entire private investment remains at poor level, only 0.72% in the case of domestic enterprises and 0.81% from foreign ones.	ž Subjective consolidation of related infrastructure ž Technical cooperation on food processing ž Technical transfer on food-related industries (machine operations etc)	ž	ž
7.Statistics	7.1 Statistical information	ž Edition of census has interrupted since 1993-94, and after the interruption statistical data has been obtained by multiplying the last data by escalation rates, thus the resulted data are not correct. ž Insufficient data management system in data-files of TS offices	ž Restoration of Fishery census by MOLF ž Reorganization of information management system in regional offices	ž	ž Provision and amelioration of fisheries information