



Improving Myanma Agricultural Extension Services: Empirical Study on Views and Perception of Field Extension Agents in Mandalay Division of Myanmar

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Kyoto Working Papers on Area Studies No.123
(G-COE Series 121)

January 2012

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Kyoto University
46 Shimoadachi-cho,
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ISBN 978-4-901668-97-2

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The publication of this working paper is supported by the JSPS Global COE Program (E-04):
In Search of Sustainable Humanosphere in Asia and Africa.

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Khin Oo and Kazuo Ando^{**}

Introduction

As Myanmar agricultural extension is entirely shouldered by the government since it has been conducted, the Ministry of Agriculture (MOA) has established the Department of Agriculture (DOA) in 1906. After changing the several appropriate names due to the aims of national policies, the MOA was reformed as the Ministry of Agriculture and Irrigation (MOAI) in 1996¹. By the late 2006, there are 14 institutions under the MOAI. Among them Myanmar Agriculture Service (MAS), Myanmar Farm Enterprise (MFE), Myanmar Cotton and Sericulture Enterprise (MCSE), Myanmar Sugarcane Enterprise (MSE), Myanmar Jute Industries (MJI) and Myanmar Perennial Crop Enterprise (MPCE) are mainly responsible for the development of technologies and the subsequent transfer of appropriate agro-technologies to the farmers². They have established their separate extension departments for various specific crops (MAS 1999a and DAP 2005). The enterprises are planned to reorganize as Myanmar Industrial Crops Development Enterprise (MICDE) again under a managing director for the better management by 2006.

The extension department has two main functions. The first one is to transfer appropriate and adaptable agricultural technologies to the farmers. The second one is to collect information on field problems encountered by the farmers and to find

^{*} The original version of this paper was read at the workshop held in the 21 Annual Meeting of the Japan Society of Tropical Ecology in Okinawa 2011 May 27-29

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¹ Since 1962 MOA was already expanded as Ministry of Agriculture and Forestry with a view for accelerated development of the agriculture, forestry and fishery sectors.

² MAS was the foremost established and crop production related department before MOAI had reorganized MAS into various enterprises. MAS was established with well organized Agricultural Extension Division (AED).

solution from research division (MAS 1999b). Myanmar agricultural extension has practised continuously the traditional extension approach, particularly more on individual contacts. This approach has been relying on the “progressive farmers” who are generally the easiest to reach and have access to sufficient resources of land, labour, physical and human capital. It was expected that adoption of technologies by progressive farmers would have a trickle down effect on the majority of farmers. Myanmar extension service has tried to improve its work by adopting the new extension concept and approach. The distinct one was the introducing of Training and Visit System (T&V) in 1976³. In order to implement this T&V system nation wide, the number of staff and the recurrent and operational costs would increase substantially, the adoption of this system in Myanmar was not considered to be appropriate. The Selected Concentrative Strategy (SCS), a similar approach to T&V, was laid down in the selected special high yielding rice production areas in 1978. Selectivity in the program was in terms of locality, rice variety, extension personnel and management. Under the concentration strategy, extension personnel were assigned to a clearly defined area and job. The SCS was successful in terms of more crop production during that time (Maung Mar 2004). After 1988, the country adopted a market economic system instead of the centralized economic system⁴. The SCS was not properly been conducted as in the planned economic system, and hence the extension approach was moved back again to the traditional approach.

At the international level, the concepts and principles of agricultural extension have changed over time and, currently, participatory extension approaches (PEA) are evolved and adopted to improve the existing extension services in many countries. A range of participatory techniques have been introduced and implemented by the United Nations Organizations, and NGOs in Myanmar since 1993 (UNDP 2000). At

³ The T & V system was introduced by Israeli extension specialist, Denial Benor in many developing countries largely through the encouragement and support of the World Bank. In 1976, the T & V system was introduced in Ayeyarwady Division (the largest rice production area) as a World Bank pilot project.

⁴ As the economic policy during that time (socialist period) was self-sufficiency and isolationism, the procurement system at below market price, the planned cropping system and the state ownership of farmland were practiced continuously.

the same time, in many countries there is a strong tendency towards the private extension agencies, because many governments got serious debt problems by spending more money than they received from their taxpayers. There are a great many private companies, and which are not always formally identified as extension services, provide advisory and other support services to farmers (Kidd et al 1998).

The government is trying to develop the agricultural and rural sectors by taking all responsibilities of the agricultural extension services and changing the strategies to get the improvement of the agricultural sector. Therefore this study is aimed to propose the existing conditions of Myanmar extension services (a) by examining the views and perception of field-level extension agents in Mandalay division of Myanmar, (b) by identifying the major problems and constraints faced in the extension work, and (c) to determine extension activities, methods and problems of the extension agents comparatively between different agricultural organizations in order to indicate the possible promoting measures for individual extension services under the Ministry of Agriculture and Irrigation.

Methods and data sources

The empirical study was conducted in the Mandalay division which has one of the largest agricultural extension services at divisional level in Myanmar. Four organizations, namely Myanma Agriculture Service (MAS), Myanma Cotton and Sericulture Enterprise (MCSE), Myanma Farm Enterprise (MFE) and Myanma Sugarcane Enterprise (MSE) were included by selecting the respondents proportionately. MJI and MPCE were being started during the survey and they were not included in this study. The plans of interview scheme were made with the permission of official concerned from each organization in 2004 December.

The stratified random sampling was used to get the field-level extension agents with the defined criteria. The data were collected from the total sample number of 206 respondents with the structured interview schedule in group interview method and analysed with the Statistical Package for Social Science (SPSS) program. Ten group interviews were done at their meeting rooms of the respective organizations in the following places (Table 1).

Table 1 Sources of primary and secondary information

No.	Organization	Sources (Extension offices)
1	MAS	Pyin Oo Lwin Township, Mandalay Division, Kyaukse Township, Meiktila District, Wan Twin Township, Yamethin District, Pyinmana Township.
2	MICSE	Mandalay Division, Kyaukse Township, Meiktila District, Yamethin District.
3	MSE	Manadalay Division, Pyinmana Zoen.
4	MFE	Pyin Oo Lwin Township, Katetchin Farm, Manadalay Division

Source: Field survey 2004

Results and Discussion

Assigned duties of field staff

According to their personal experiences, cultivated areas assigned for a field level extension agent were 120 to 600 (average 300) hectares of rice in MAS. In MSE, the assignments were varied from 120-340 hectares of cane for a village-level extension agent (VEA), 146.8 - 440 hectares for a village-tract level extension agent (VTEA) and 400 - 2200 hectares for an extension officer (EO). The cultivated cotton areas 200 - 400 hectares to a VEA and 400 - 2000 hectares to a VTEA/EO were assigned in MCSE. Due to the nature of crop, 312.8 average hectares of coffee plantation was assigned to an EO in MFE (Table 2).

Table 2 Assignments for field extension agents

Organizations	Rank	Assigned duties	
		Cultivated areas (ha)	Number of farmer
1. MAS		120-600 (av:300)	
2. MSE			
	VEA	120-340	106-248
	VTEA	146.8-440	272-404
	EO	400-2200	350-2500
3.MCSE		400-2000	
4.MFE			
	EO	24-624 (av: 312.8)	

In MAS, one senior VTEA supervised 6-7 VEAs/VTEAs in one production camp

With the existing strength of staff and respective crop areas, one extension staff is required to supervise about 733 hectares of paddy, 290 hectares of cotton and 217 hectares of sugarcane (Maung Mar 2004). According to these data, it can be seen that extension staff and crop area ratio in this study was relatively high in MCSE (minimum of 400 hectares).

Different types of extension activities

Agricultural extension practised in a country may have its own specific system and approach. In order to find out Myanmar extension services in practice, different types of extension activities were investigated and shown in Table 3. The extension agents' major activities were contacting with farmers for the reasons of supervising demonstration plots, to collect statistical data and information from farmers, to distribute inputs, and to accompany the senior government officials who are responsible for agricultural policy (Table 4). It is clear that the extension agents may deal with other people in their working environments besides their clients. Nowadays, agricultural supervisory committees are formed at every administrative level and extension agents are one of the members for supervising the development of agricultural production. Writing reports and records, attending meetings, distribution of inputs and conducting demonstrations were the common activities in the descending order.

Table 3 Different types of extension activities

Extension activities	Time spent %		
	Mean	Std. deviation	Maximum
1. Contacting with farmers	25.7	17.25	75
2. Writing report & record	18.6	16.58	100
3. Attending meeting	17.3	14.08	100
4. Distribution of inputs	11.5	10.58	50
5. Demonstration	11.1	11.83	100
6. Collecting data	10.5	10.90	80
7.	5.3	12.02	100
Others(research/production)			
Total	100.0		

n = 206

Table 4 Reasons for contacting with farmers

Reasons	% of respondents^(a)
1. To record & collect data	23.3
2. To observe demonstration farm	23.3
3. To accompany other government staff	20.2
4. To distribute subsidies & credit	17.1
5. To deal with socialization	16.1
Total	100.0

^(a) n = 206

Different kinds of extension methods

As Myanma agricultural extension service is categorised under the traditional extension approach, it is needed to identify the common practices of extension methods or techniques. The extension agents usually used the farm and home visits (21%), group discussion (20.5%), demonstration (18.6%), training methods (17.1%) and mass media (6.8%) (Table 5). In their extension work, the extension agent had to contact with the local administrative authority, other government staff and in some cases, informal leaders such as village youth leaders, Buddhist monks and priests (Table 6).

Table 5 Type of extension methods

Methods	% of respondents^(a)
1.Farm and home visits	21.1
2.Group methods	20.5
3.Demonstration	18.6
4.Training	17.1
5.Office calls	15.9
6.Mass media	6.8
Total	100.0

(a) n = 206

Table 6 Other contact persons in extension work

No.	Other contact persons	% of responses
1	Administrative officials	45.6
2	Other government staff	27.2
3	Monk or priests	16.0
4	Village youth leaders	11.2
Total responses		100.0

Available facilities in extension work and their assigned supervision

According to the nature of the extension work, 85% of the respondents travelled in their assigned areas with an average of 10 trips per month and one third of them had to stay overnight for their trips. Most of them used their own bicycles and the rests were taking various means of transportations (Table 7). Means of transport were not provided by their respective organisations. However, limited amount of travelling allowances are allotted for extension agents in every organisation.

Table 7 Mobility and type of transportation

No.	Items	% of responses
1	Time spent for a trip	
	No trip	12.8
	Within a day	43.8
	Stay overnight	34.0
	Spent few days	9.4
	Total	100.0
2	Type of transportation	
	Bicycle	42.1
	Motorcycle	18.5
	On-foot	18.1
	Car	13.9
	Train	6.9
	Boat	0.5
Total responses		100.0

Major problems and constraints in extension work

(a) Extension agents' perception on their extension work

Common problems which are being faced by the extension agents were selected and grouped into eleven items. In each item, four levels of the agents' perceptions, namely strongly agree, agree, disagree and strongly disagree were given as their indications, and the scoring was done by assigning 4, 3, 2 and 1, respectively. The values of the extension agents' perceptions (>2) on their work are tendency to show agreement of the extension agents. Mean value of 2.68 indicated that the respondents agreed on poor transportation. They also agreed that there was no incentive for extension staff (2.38) and the number of extension staff were inadequate to do extension work effectively (2.32) (Table 8). The perceived main problems in extension work were categorised in three issues. The first issue concerned with extension staff was poor transportation facilities for mobility, no incentives for extension staff and inadequate staff to do extension work effectively.

Table 8 The respondents' perceptions on the extension work

Perceived problems	Mean	Std. deviation	Maximum
1. Poor transportation	2.68	1.387	4
2. No incentives for agents	2.38	1.336	4
3. Inadequate number of agents	2.32	1.325	4
4. No suitable market and price	2.20	1.209	4
5. Too many farmers to give advice	2.19	1.315	4
6. Extension programs are not related to the need of community	2.13	1.195	4
7. People are not involved in extension planning	2.11	1.175	4
8. Farmers are conservative	2.11	1.230	4
9. Farmers are poor	2.11	1.236	4
10. No cooperation of people in extension implementation	1.97	1.150	4
11. Farmers are illiterate	1.95	1.195	4

Scales: 4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree

n = 206

The second one concerning with extension work was in-availability of suitable market and prices for farmers, irrelevant extension programs to the needs of local people and no involvement of the community in extension planning. Concerning with farmers, the main problems in extension work were the conservatism and poor conditions of farmers.

(b) Major problems and constraints experienced in extension contacts

In making contacts with farmers the constraints were having too many farmers to contact, having the distance too far to travel, poor transportation and too much time being consumed in office work (Table 9). Due to those constraints 30% of the extension agents were able to contact with only 50% of their farmers.

Table 9 Major problems and attitudes in contacting with farmers

Type of problems and attitudes	% of responses
1. Too many farmers to contact	19.1
2. Travelling distance is too far	19.1
3. Not enough time	15.1
4. Problems with travelling	13.8
5. Time consumed in office work	11.7
6. Other alternatives	9.1
7. No need to contact with all farmers	7.4
8. Too many regulations	4.7
Total responses	100.0

Extension activities conducted in different organizations

The type of organization influenced on the activities of the extension agents such as distribution of inputs ($F=3.514$), demonstration ($F=5.087$), data collection ($F=5.352$) and contacting with farmers ($F=4.295$) were highly significant at $p=0.000$ and 3 df (Table 10).

It was found that MAS focused mainly on reporting, MSE on meeting and contacting with farmers, MFE on data collection, demonstration, research and production of its own farm, and MCSE on distribution of inputs. The significant influence of organizations may be explained that since the organizations followed

their specific mandate and programs, the extension activities they performed were quite different from each other.

Table 10 Extension activities conducted in different organizations

Employing agency		Attending meetings	Distribution of inputs	Collecting data & Information	Writing reports & records	Contacting with farmers	Demonstration	Other activity
MAS	Mean	15.93	11.45	11.34	20.56	23.82	12.08	4.82
	Std.Dev	12.63	10.69	9.68	18.33	16.52	12.84	10.67
MCSE	Mean	19.26	14.49	8.49	18.94	26.51	8.49	3.83
	Std.Dev	11.58	10.15	7.13	14.44	15.17	6.25	6.32
MFE	Mean	16.52	5.65	15.65	11.22	23.17	16.26	11.52
	Std.Dev	22.28	8.44	18.42	12.03	20.51	13.63	19.97
MSE	Mean	23.05	12.89	3.42	15.26	38.42	3.68	3.26
	Std.Dev	13.22	10.97	7.46	10.86	16.67	5.43	13.75
Total	Mean	17.32	11.45	10.55	18.61	25.69	11.09	5.29
	Std.Dev	14.08	10.58	10.90	16.58	17.25	11.83	12.02
F		1.68^{ns}	3.51*	5.38**	2.36^{ns}	4.30**	5.09*	2.53^{ns}

*

df = 3 , n = 206, MAS=114, MCSE=35, MEF=23, MSE=19, Missing value =15

** Significant at 1 % level, * Significant at 5 % level, ns = Not significant

Extension methods used in different organizations

The extension methods used by the respondents were significantly different between the four organizations except mass media (Cramer's V= 0.27 to 0.519). In farm and home visits, groups, demonstration and training methods the value of p were 0.001 and p=0.005 in case of the office calls (Table 11).

The effect of organization was found on all methods except mass media. MAS conducted more training than the others. It can be explained that as MAS was the foremost established and largest service in agriculture, the MAS's respondents were found to be able to use the training methods. MCSE used farm and home visits, group, demonstration and media more frequently than others. MSE was more concerned with office calls and demonstration.

Table 11 Extension methods used in different organizations

Extension methods	Organization employed										Cramer's V
	MAS		MCSE		MFE		MSE		Total		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
1.Farm & home visits method	0.85	0.36	0.91	0.29	0.49	0.51	0.89	0.32	0.80	0.40	0.372**
2.Group methods	0.88	0.33	0.91	0.29	0.32	0.48	0.84	0.38	0.78	0.42	0.519**
3.Demonstra- tion methods	0.78	0.41	0.79	0.41	0.35	0.48	0.79	0.42	0.71	0.46	0.367**
4.Training methods	0.83	0.38	0.59	0.50	0.35	0.48	0.26	0.45	0.65	0.48	0.459**
5.Office call methods	0.67	0.43	0.65	0.49	0.32	0.48	0.68	0.48	0.60	0.49	0.27*
6.Mass media methods	0.26	0.44	0.41	0.50	0.22	0.42	0.05	0.23	0.26	0.44	0.206 ^{ns}

n = 206, MAS = 115, MCSE = 37, MSE = 35, MFE = 19

** Significant at 1 % level, * Significant at 5 % level, ns = Not significant

Perceived problems of extension work

Concerning with the respondents' perceived problems in their work, eleven items were asked to express their perceptions. The respondents' perceived responses were assumed as scale measurement and Analyses of Variances (ANOVA) were used to know the effect of organization on the respondents' perceived problems. It was found that a major factor affecting the respondents' perceived problems was the organization employed ($F= 6.873$ to 24.44 , $p= 0.000$) (Table 12). Comparing the means of each organization's perceived problems, three problematic conditions could be explained. The first one was related to the extension program planning and implementation. The second problem was related to the working conditions. The third problem was concerned with the farmers.

The major perceived problems in specific organizations were (a) poor transportation, no cooperation of local people in extension program implementation, and problems with conservative and poor farmers complained by MAS staff; (b) irrelevant extension programs to the needs of community, no suitable markets and prices for

farmers, inadequate staff and too many farmers to advise, and problems with illiterate farmers indicated by MCSE staff; and (c) no involvement of local people in extension planning, and no incentives for staff perceived by MSE staff. The MFE's respondents expressed the least mean scores for all perceived problems among them.

Table 12 ANOVA tests for the effects of organization on the respondents' perceived problems

Perceived problems		Organization				F value
		MAS	MCSE	MFE	MSE	
1. Needs of local community	Mean	2.33	2.35	1.22	2.32	10.003**
	Std.Dev.	0.97	0.98	1.48	1.42	
2. Extension program planning	Mean	2.37	2.18	1.03	2.53	15.572**
	Std.Dev.	0.88	1.09	1.40	1.31	
3. No cooperation in implementation	Mean	2.28	2.00	0.89	2.16	17.011**
	Std.Dev.	0.89	1.13	1.22	1.26	
4. No suitable market & price	Mean	2.42	2.44	1.16	2.42	12.914**
	Std.Dev.	0.96	1.11	1.37	1.47	
5. Farmers are illiterate	Mean	2.08	2.44	1.08	2.00	10.066**
	Std.Dev.	1.03	0.99	1.42	1.25	
6. Farmers are poor	Mean	2.38	2.06	1.24	2.21	8.922**
	Std.Dev.	1.01	1.13	1.52	1.36	
7. Too many farmers to give advice	Mean	2.47	2.71	0.76	2.32	24.440**
	Std.Dev.	0.97	1.32	1.19	1.57	
8. Extension staff is inadequate	Mean	2.55	2.71	1.05	2.68	17.093**
	Std.Dev.	1.06	1.24	1.37	1.46	
9. No incentive for extension staff	Mean	2.65	2.12	1.62	2.68	6.873**
	Std.Dev.	1.12	1.18	1.69	1.49	
10. Transportation is poor	Mean	2.97	2.74	1.76	2.68	7.817**
	Std.Dev.	1.13	1.40	1.69	1.46	
11. Farmers are conservative	Mean	2.41	2.18	1.16	2.05	11.064**
	Std.Dev.	0.97	1.11	1.46	1.47	

MAS = 115, MCSE = 37, MSE = 35, MFE = 19, n = 206, ** Significant at 1 % level,

According to the findings, the following assumptions can be made:

*MAS- no cooperation of local people in their extension implementation and poor transportation in extension related trips; still facing the problems to organise farmers to accept their technologies.

*MCSE- extension program was not related to the needs of local people; lack of suitable market and price for the farmers' products, such as cotton.

*MSE- extension program was lacking local people's participation; staff were not motivated in doing their job because of no incentives such as promotion, good salary

and other moral support.

Difficulties and attitudes on personal contacts

Organizational effects were highly significantly found in “too many farmers to contact” (CC=0.357, p=0.000), “not enough time to contact” (CC=0.267, p=0.000), “time consumed in office work” (CC=0.22, p=0.000), “no need to contact with all” (CC=0.024, p=0.000) and “other alternatives can be made” (CC=0.257, p=0.000) instead of contacting all farmers (Table 13).

Table 13 Difficulties and attitudes on personal contacts

Problems and attitudes on personal contacts		% of respondent ^(a)				Contingency Coefficient
		MAS	MCSE	MFE	MSE	
1. Too many farmers to contact	(No)	26.1	2.9	13.2	26.3	0.357**
	(Yes)	51.3	82.9	2.7	63.2	
	Missing value	22.6	14.3	54.1	10.5	
2. Distance is too far	(No)	31.3	11.4	27.0	36.8	0.191*
	(Yes)	49.6	62.9	32.4	52.6	
	Missing value	19.1	25.7	40.5	10.5	
3. Not enough time	(No)	32.2	11.4	35.1	47.4	0.267**
	(Yes)	40.0	65.7	10.8	36.8	
	Missing value	27.8	22.9	54.1	15.8	
4. Time consumed in office work	(No)	41.7	45.7	32.4	46.3	0.220**
	(Yes)	31.3	21.9	16.4	63.2	
	Missing value	27.0	31.4	51.4	10.5	
5. Problems with travelling	(No)	33.1	28.6	27.0	52.6	0.167 ^{ns}
	(Yes)	39.1	34.3	24.3	36.8	
	Missing value	27.8	37.1	48.6	10.5	
6. No need to contact with all farmers	(No)	51.3	51.4	35.1	68.4	0.024**
	(Yes)	23.5	11.4	10.8	21.1	
	Missing value	25.2	37.1	54.1	10.5	
7. Too many regulations	(No)	52.2	37.1	30.1	57.9	0.178*
	(Yes)	10.4	20.0	5.4	21.1	
	Missing value	37.4	42.9	59.5	21.1	
8. Other alternatives	(No)	40.9	14.3	32.4	57.9	0.257**
	(Yes)	23.5	45.7	5.4	21.1	
	Missing value	35.7	40.0	62.2	21.1	

(a) MAS = 115, MCSE = 35, MFE = 37, MSE = 19, n = 206

** Significant at 1 % level, * Significant at 5 % level, ns = Not significant

The organization’s influences were found in the problem statements of having too many farmers and not enough time to contact them, mentioned by MAS and MCSE

staff, and they also proposed that other suitable methods should be used. MSE staff indicated too much time being consumed in office work. Therefore, they suggested that instead of doing personal contacts with the farmers, other alternative methods, for instance, group, mass media and field days could be used.

Conclusion and recommendation for policy implication

In case of Myanmar extension services delivered and funded by the State, a top-down approach, no incentives for staff, poorly motivated staff and management, lack of transportation, little involvement of local people in extension planning, no suitable market and prices for farmers, too many farmers to give advice and problems with illiterate farmers were revealed in this study. Moreover, the planning processes of extension programs rarely considered production constraints, farmers' needs and local extension views and conditions. According to the different organizations with their own mandate and administration MAS and Enterprises had different extension activities, methods and problems. This study clearly showed that due to the heavily reliant on the groups and individuals methods (favourably on farm & home visits) for extension works poor transportation, inadequate extension staff and too many farmers to contact in visiting farm and home are evolved as major problems. To be effective these extension methods and to solve these problems, mass media should be used increasingly in present extension services. Mass media can reach uniform message to the mass people rapidly.

To carry out extensive mobility and field work, it is essential to have sufficient funds and resources for extension workers to carry out their jobs. Extension organization should not commit more than 60-70% of its budgetary resources for personal emoluments, so that it can provide sufficient funds for programmed operations.

The finding also revealed an essential requirement of a well-defined system of human resource management (HRM) within extension organization to increase the capabilities, motivation and overall effectiveness of extension personnel. The development of a reward system is an important aspect of HRM and can be improved by three ways: (1) rewarding for superior performance, (2) improved

working conditions at the field level (e.g. field allowance) and (3) career planning and development of extension personnel.

In terms of extension program planning and implementation, there was a lack of suitable markets and prices for the target agricultural products. Therefore, there is a need for developing agricultural policies and supporting strategies which promote effective and sustainable extension services for farmers based on farmers' needs.

To improve the existing Myanmar extension services, the extension services can be reformed in "two ways". The first one is decentralization or subsidiarity. Decentralization (deconcentration, delegation and devolution) includes administrative and political-fiscal devolution of program and funding decisions and staff accountability to local units. Its impact depends on the extent of political and societal democratisation at the local level. Various functions of decentralization, such as building local capacity for farmers' involvement in extension programming, housing extension agents locally and making them responsible to farmers' associations, and designing resource mobilization and funding mechanisms are taken in this approach. Decentralization can transform the top-down structure and operation of a public service bureaucracy, and positively affect several of the generic problems of extension. The farmer field school (FFS) is one of the extension devolution approaches.

The second solution is using the "empowerment and participatory approaches". Participatory approaches have positive effects for most of the generic problems of extension. These approaches also have a positive effect on farmer-led experimentation and analysis, and farmer feedback. Fiscal sustainability is improved through mobilizing local resources. Cost-effectiveness and efficiency are achieved by using relevant methods that focus on expressed farmer needs and local people taking over many extension roles. However, not all participatory attempts produce a wholly positive effect. Often decentralization is virtually a prerequisite for effective local participation.

Acknowledgement

I would like to appreciate the G-COE project “In Search of Sustainable Humanosphere in Asia and Africa” of Kyoto University to provide an opportunity to print this working paper. I would like to express my heartfelt thankfulness to the colleagues of Center for Southeast Asian Studies and the responsible personnel for their interest, constructive comments and suggestions for improving this paper.

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