

The Necessity of Structural Reform for the Development of Bangladesh Agriculture With Special Reference to Japanese Agricultural Productivity.

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Abstract

In Bangladesh about 80% people live in rural areas and they depend primarily on the agro-based production. The climatic condition of this country is very suitable for this sector. Domestic agricultural production increased at a relatively steady rate in the period following independence, but not fast enough to close the gap created by the continued rapid growth in population. The goal of food grain self-sufficiency by 2002 was asserted as part of the Fifth Five-year (1997-2002) plan, but it can be achieved only under optimal conditions. In fiscal year 1999-2000 and 2000-2001 Bangladesh imported 2.104 and 1.556 million tons of food grain (rice and wheat) to meet minimum needs for the subsistence of the population. Although the agriculture sector has a great potential it has not changed the conventional production structure so it has not been able to achieve the goal. In the perspective of Bangladesh, the population is increasing on the one hand and cultivable land is decreasing on the other. To meet the basic need of food for the huge population cultivating the limited number of lands, our argument is that the agricultural productivity, especially land productivity, must be increased. There is no suitable infrastructure for the implementation of a programme to monitor crops cultivation and also effective farmers' organizations are hardly ever seen in Bangladesh. Referring to Japanese agricultural product i.e. rice and wheat yield rate and comparative production cost, this paper points out the necessity of structural¹ reform at a production level in introducing the group farming system in Bangladesh. Our research and prominent researchers reveal that group farming is comparatively more able to be effective for productive betterment than in that of individual farming.

Key Words: Production structure, Agricultural inputs, Group farming, Yield rate and Bangladesh.

1. Introduction

Bangladesh is a developing country of south Asia, having a tropical climate with 131.5 million (Annual report 2000-2001, Bangladesh Bank) people. The topology of Bangladesh is almost flat with no great mountains or desert. The population density of per square kilometer of total area and per square kilometer of cultivable land is 981 and 1480 respectively, which stands to be the highest in the world. Total cultivated lands are 17.77 million acres, in which 8.59 million acres of

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¹ The term 'structure' is predominately used here to refer to the resources-the primary factors of production: Capital, labor and resources-which comprise the productive of a farm. Agricultural structure sometimes means structure of land tenure and farm organization. We would also like to emphasize on farm organization.

² Bangladesh Bureau of Statistics.

land are under irrigation facilities (Statistical Year Book of Bangladesh, 98, BBS²). In 1997, the per capita land availability of Bangladesh was 0.272 acres, declining from 0.395 acres in 1981. Bangladesh Household Income and Expenditure Survey 2000, prepared by BBS, shows the incidence of national poverty has declined from 58.8% to 49.8% between 1991/92 and 2000. The income poverty has to be brought to 25% if Bangladesh wants to achieve Millennium Development Goal of halving the number of poor people by 2015. For this, Bangladesh needs to sustain a GDP growth of about 7% per year over the next 15 years. It may be mentioned that by avoiding the agriculture sector and only emphasizing on industry and service sector, it is not possible to attain that goal. At present, agriculture plays a vital role in the growth & stability of the country's economy as is indicated by its share in GDP 25.5% (World Bank Report, 2000), employment 48.5%, and export earning. The staple crop is rice with paddy fields accounting for nearly 70% of all agricultural land. Nowadays, one of the main food grains is wheat, which is not a traditional crop in Bangladesh. During the 1960s and early 1970s, however, it was the only commodity for which local consumption increased because external food aid was most often provided in the form of wheat. In the first half of the 1980s, domestic wheat production rose to more than 1 million ton per year but was still only 7 to 9 percent of total food grain production. Record production of nearly 2 million tons was achieved in FY³ 1998-99, about half the wheat is grown in irrigated land. Rice and wheat production has increased every year in the 1980s and 1990s but the annual increase has generally been modest, barely keeping pace with the population. Furthermore productivity of these crops is very low compared with Japan.

It is well known to all that high yield varieties of seed, tractor, application of fertilizer and irrigation play an important role to increase yields. "The usual management practices associated with intensification⁴ are better seed, correct time in planting, proper plant populations and more thorough cultivation operations. These are usually complemented by the use of purchased inputs, particularly fertilizers and insecticides." (Collinson, M, 1983). The adoption of modern seed-fertilizer-irrigation technology in rice production has clearly been the main factor behind the growth in crop agriculture (Bangladesh Agriculture in the 21st century, 1995: The World Bank Bangladesh Office 1). In addition, it can be said the logic of the World Bank is not only applicable in rice cultivation but also in wheat, vegetables and so on. Most of the farmers of Bangladesh are under the poverty level (36% of population are below national poverty line) and also illiterate (59% of total population). For these reasons they have not adequate buying and utilizing capacity mentioned inputs. Adoption of the modern inputs to be difficult for small subsistence farmer who have little financial capacity to purchase (Hayami, Yujiro, 1981). In Bangladesh there is no suitable infrastructure for the implementation of programmes to monitor crops cultivation and also hardly seen to form effective farmers' organization.

Government food policy will certainly affect attainment of the food production potential of the country. The food production Policy of Bangladesh has the following main objectives:

- 1) To stabilize food prices for the customers.

³ In Bangladesh, (FY) fiscal year begins from July and ends in June.

⁴ Intensification is used here to describes measures design to increase the productivity of the land already used by the peasant farmer. It is separate from an extension of scale, which implies use of an increased amount of land. Population pressure usually leads to agricultural evolution, forcing farmers to adopt more intensive methods of using their land.

- 2) To provide the minimum incentive price for the producers.
- 3) To maximize food production in order to achieve self-sufficiency as early as possible.
- 4) To promote the development of winter crop, which are less prone to damage by natural hazards (Dayal, Edison, 1997).

Within the above mentioned objectives we would like to focus on the point 3, adopting group farming system on the purpose of increasing productivity.

2. Results and Discussion

① Production Structure of Agriculture in Bangladesh

Bangladesh is one of the most densely populated countries on earth, rapid population growth and a tradition of bequeathing land to all heirs has led to fragmentation of holdings. Double cropping is the norm and many farmers grow as many as three crops a year. Rice dominates the cropping pattern in most parts of the country and is grown in three different seasons *aus*⁵, *aman*⁶ and *boro*⁷. *Boro* rice, which requires intensive irrigation, is grown at the same time as wheat during the cool dry winter season called *rabi*. Thirty years ago almost all of Bangladesh cereal production was from the monsoon crop. In recent years *boro* rice has gained importance. Because yields of *boro* rice are higher than yields of other types of rice, the crop now accounts for a disproportionately large share of rice production. The agricultural year begins in late February, when the weather is dry and getting warmer. Over a period of several weeks each field is plowed three or four times; usually using a wooden plow and two oxen, one person can plow 0.11 hectares in an eight to ten hour workday. In addition to plowing, field preparation for irrigation involves construction and maintenance of plot boundaries, using earth and weeds from the field. These boundaries also serve to retain water in the plots when the rains



Figure 1. The map of Bangladesh, the country has an area of 144,000 square kilometers and extends 820 kilometers north to south and 600 kilometers east to west. Bangladesh is bounded on the west, north and east by a 2,400-kilometer land frontier with India and in the southeast, by a short land and water frontier (193 kilometers) with Myanmar.

⁵ Sown in March or April, benefits from April and May rains, matures during the summer rains and is harvested during the summer.

⁶ Transplanting during the summer monsoon and is harvested in November/December.

⁷ With the increasing use of irrigation, *boro* rice growing season extended during the dry season from October to March.

come a few months later. Modern irrigation machineries such as lift pump, deep tube well, shallow tube well are used in irrigation but they are not adequate enough. In those rural areas where electricity is available, tube wells with electric pumps are becoming an important irrigation device. Besides these, traditional⁸ methods of irrigation are also being used.

The ownership of agricultural land remained one of the most difficult problems in the countryside in Bangladesh. In most villages, a few families control enough land to live comfortably, while a large percentage of families have either no land or not enough to support them. The disparities between the richest and poorest villagers appears to be widening over time. Islamic inheritance law is being practiced in Bangladesh which calls for equal division of assets among all the sons, the growing population leading to an increase in the fragmentation of landholding and further impoverishment. Inheritance, purchase, and sale have left the land of many families subdivided into a number of separate plots located in different areas of the villages. The ready availability of large numbers of poor laborers and the fragmented character of many landholdings has perpetuated a labor-intensive style of agriculture and unequal tenancy relations. At least one third of the households in most villages are using rented land. Sharecropping is the most common form of tenancy agreement. Traditional sharecropping arrangement heavily favored the landlord over the sharecropper, with a fifty-fifty split of the produce and the tenant providing all inputs of seeds, labor, fertilizer, and irrigation. After decades of rural agitation, the 1984 Land Reforms Ordinance finally established the rule of three shares-one-third of the produce for the landowner, one-third for the sharecropper and one-third split according to the costs of cultivation. Poor peasants who could not obtain land as tenants have to work as agricultural laborers or find nonagricultural jobs. The 1984 Agricultural Labor Ordinance set the minimum daily wage for agricultural labor at 3.28 kg of rice or its cash equivalent. Statistics revealed in 1995-96 that shows the percentage of agri. labor force is 51.12 out of total labor force. Disguised⁹ unemployment is severely found in Bangladesh agriculture. Employment ratio of agricultural labor force by sex in 1989, male and female is 7:1. Single farming is one of the most important characteristics of Bangladesh agriculture. The trend features of farm structure over the last three and a half decades are as follows:

1. A proliferation of small and marginal farms;
2. Relatively consolidation of the middle category; and
3. An Overall shift downs evident in the relative decline in the large farm category.

(Bangladesh Agriculture in the 21st century, 1995, The World Bank Bangladesh Office-1)

② Characteristic of Japanese Agricultural Structure

Mountainous areas account for 61% of the total national land and there is limited flat land available in Japan. Consequently, competition exists in land use. Under these circumstances, the ratio of farmland is about 13.5% of the total nation. In Japan, rice crop farming (39% of total cultivated land) has been operated nationwide as a key planting system suitable for its hot and rainy

⁸ Traditional method of irrigation include pitcher, swing basket and a hallowed-out log fixed on a pivot and fitted with a counterbalance.

⁹ Persons engage in a specific sector more than required numbers and enjoy equal facilities is called disguised unemployment. Disguised unemployment is severely found in Bangladesh agriculture. As a large number of workers seek employment in agriculture and more labor engages in per unit of land area, the productivity of labor is being reduced and the wage rate is being bid down.

summer season and wheat is being cultivated some places in Japan accounted to 4% of total cultivated land.

Since the time of Basic Agricultural Law 1961, the government has introduced measures as part of structure policy for the rationalization of farm land and the modernization of agricultural management to achieve improvement in the scale of Japanese farming. More specifically, these include measures for the consolidation of farmland, introduction of mechanization, improvement in farm management practices and diversification of agricultural activities.

At present, a distinctive feature of Japanese agriculture is the small size of landholding per farm. Of the total farms in 1997, around 23 percent had a cultivated area of less than 0.5 hectare, cumulatively nearly 59 percent of farms were less than 1 hectare and only 14 percent were larger than 2 hectares in area (excluding Hokkaido, commercial farm household only). Another characteristic of Japanese agriculture is the importance of part-time farming. Part-time farming accounts for a substantial part of Japanese agriculture in terms of farm numbers, share of agricultural output and resource use. Japan's definition of part-time farm households includes very small farms and any farm in which one or more household members are engaged in job other than farming. Part-time farming in Japan is not a new phenomenon, however. In 2000, 81.8 percent of farm households¹⁰ were estimated to be part-time farm operators. Of the 3.12 million farm households in existence in 2000, 74.90 percent were classified as commercial¹¹ farms and 25.10 percent as non-commercial¹² farms.

The number of farm household population (farm household members) was 13,460,000 in 2000 and the proportion of farm household population to the total population was 10.6 percent. The proportion of male and female agricultural labor force is 48.8% and 51.2% respectively. The average age of farm household members entering agriculture is also well

Table 1: Brief on Japanese Agricultural Structure

Serial Number	Particulars	
1.	Total farm household members	13,460,000
2.	Proportion of farm household population to the total population	10.6%
3.	Total planted area of crops	4,563,000 hectares
4.	Rice planted area	1,770,000 hectares
5.	Wheat planted area	197,000 hectares
6.	Ratio of farmland of total area	13.5%
7.	Farms, less than 0.5 hectare	23%
8.	Farms, less than 1 hectare	59%
9.	Farms, more than 2 hectares (Excluding Hokkaido, commercial farm household only)	14%
10.	Full-time farming households	18.20%
11.	Part-time farming households	81.80%
12.	Commercial farm households	74.90%
13.	Non-commercial farm households	25.10%
14.	Male engaged in farming	48.80%
15.	Female engaged in farming	51.20%
16.	Persons of 65 years or over engaged in farming	28.60%

Source: Summary result of 2000 world census of Agriculture and Forestry, 30th Nov, 2000, Statistics and Information Department, MAFF, Japan. Aggregate of Planted Area of Crops and Utilization Ratio of Cultivated Land, 2000, MAFF, Japan.

¹⁰ Households that manage cultivated land of 10a or more or these those have cultivated land under management of less than 10a but have agricultural products sales of Yen 150,000 or more in a year.

¹¹ Farm households with cultivated land of 30a or more of sales of agricultural products of Yen 500,000 or more.

¹² Farm households with cultivated land of 30a less and sales of agricultural products of Yen 500,000 or less.

Note: 1 are = 100 square meters.

above those in other industries. This trend, in part, may reflect the role of the elderly or retirees (formerly engaged in off-farm work or as part-time farmers) in farm households, who take on the responsibility for the daily maintenance of small rice farms, for example, on a full-time basis after retirement from off-farm work. The population of elderly workers returning to the farm sector has increased since the general slowing in growth rates of the economy from the late 1970s. Observing the structure of farm household members by age, it is clearly found that the proportion of the aged members of 65 years and elder is the highest (28.6%).

Among many other farming systems, in recently, group farming has developed in various fields of farming. This is due to the partial disruption of traditional mutual aid, intra-familial or inter-familial and at the same time to the overall necessity of the modernization of capital equipment. Group farming has attracted attention in the field of agricultural policy in Japan for group farming has come to be considered as an important countermeasure to the structural problem. In fact, the cooperation of farming or group farming is expanding by various organizations and in various fields of farming. It could be said that in Japan there should be almost no family farm that does not participate in some group farming (Takekazu, OGURA, 1981, pp.626).

③ Food grain Production and Requirement Gap In Bangladesh

Agricultural growth performance is one of the most critical aspects of Bangladesh's struggle to achieve economic development. For about three decades since the early 1970s, food grains, mostly rice, have predominantly led agricultural growth in Bangladesh. The population of Bangladesh is growing at the rate of about 1.6% and is expected to reach 151.68 million by 2010. Food security for this large number of population means everybody has access to foods of different types that ensure adequate calories and protein intake through self-production or purchase. Currently Bangladesh is a food deficit country.

In fiscal year 1999-2000 and 2000-2001 Bangladesh imported 2.104 and 1.556 million tons of food grain (rice and wheat respectively) to meet minimum needs for the subsistence of the popu-

Table 2: Food grain production and Requirement Gap.

Year	Mid-Year Population (Million)	Domestic Production ('000' mTons) Rice+Wheat	Net Production ('000' mTons) After deducting 10% for Seed, Feed & Wastage	Food grain Consumption Requirement ('000' mTons) (16 oz/day/cap)	Food Requirement Gap ('000' mTons)
1990-91	111	18856	16970	18378	1407
1991-92	113	19317	17385	18709	1323
1992-93	115	19517	17565	19040	1475
1993-94	117	19172	17255	19371	2116
1994-95	119	18078	16270	19702	3432
1995-96	121	19056	17150	20033	2883
1996-97	123	20337	18303	20364	2061
1997-98	125	20664	18598	20695	2098
1998-99	127	21813	19632	21026	1395

Note: Food grain consumption requirement has been calculated on the basis of average daily consumption (16 ounce) of food of a person. ('m' Ton = Metric ton).

Source: Ministry of Food, Bangladesh.

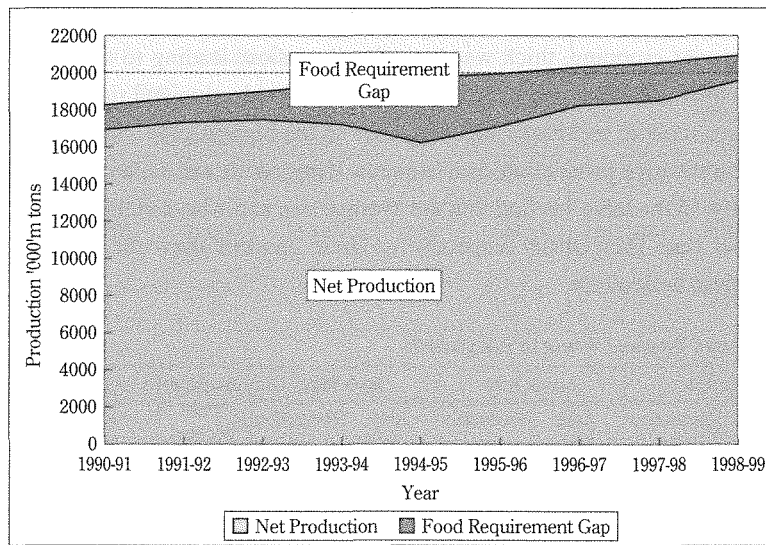


Figure 2: Food Production and Requirement Gap

lation. At the national level, all the necessary foods may be produced domestically or made up by national production and imports. It is a fact that Bangladesh does not have readily available resources to make up the shortfall quietly by imports. At the individual level, the situation is precarious for the millions of poor people, because they do not have purchasing power due to lack of income-earning opportunities. Avoiding other sources of food, we would like to discuss here both rice and wheat production and the requirement situation.

As shown in table 2 both the population and food production increased gradually year by year. It is clearly shown here that food grains production is not sufficient to the requirement.

④ Comparative Statement of Yield Between Bangladesh and Japan

It was found that there is a slight similarity between Bangladesh and Japan agriculture especially in the Kyushu flat area. Both Bangladesh and Kyushu have adequate rainfall most favorable to agriculture. Some Japanese farms consist of a number of small and scattered fields, which are similar to Bangladesh. Three crops a year are possible on lands in the warmer areas of Kyushu. Japan lies in the northeast tip of the Asian Monsoon Zone that encompasses India, China, Korea and the Southeast Asian countries. The weather is generally mild and humid with considerable variation from north to south. The climate of Bangladesh is tropical; mild winter; hot, humid summer; warm rainy monsoon. Rice is the main crop in both the regions. In Bangladesh, 70% of total cultivable lands are used in rice cultivation. On the other hand in 1999, in Japan 38.92% of total cultivable land was used in rice cultivation.

There are also many dissimilarities between Bangladesh crop production and crop production of Japan; the farm size distribution, the variety of production and the degree of mechanization and so on. In Japan, irrigation, terracing, fertilizers, high yield variety seeds and other intensive cultivation methods are widely employed and provided. As a result of ongoing improvement of irrigation infrastructures for the further development of paddy field farming, the ratio of irrigated areas

to all agricultural land is at world-class level. Paddy fields are effective in preventing damage caused by continuous cropping, thick weeds, and soil erosion, leading to stable agricultural production. Rice, wheat and other crops are highly stable in production and rich in nutrition. By applying the modern tools & technique Japan reaches to the highest crop yields per cultivated area in the world. Comparative production data between Bangladesh and Japan are figured in Table 3 and 4 respectively. In the table we find that the average rice and wheat yield of Japan are 2.69 and 1.65 times higher than Bangladesh respectively. These pictures show the deplorable yield situation of Bangladesh agriculture.

Table 3: Production of Rice and Wheat in Bangladesh

Period	Aus Rice		Aman Rice		Boro Rice		Average Yield per acre (ton)	wheat		
	Area in '000' acres	Production in '000' tons	Area in '000' acres	Production in '000' tons	Area in '000' acres	Production in '000' tons		Area in '000' acres	Production in '000' tons	Yield per acre (ton)
1992-93	4288	2075	14442	9680	6423	6587	0.73	1574	1176	0.75
1993-94	4076	1850	14029	9419	6378	6772	0.74	1520	1131	0.74
1994-95	4111	1791	13824	8509	6582	6538	0.69	1580	1245	0.79
1995-96	3840	1676	13953	8790	6804	7221	0.72	1732	1369	0.79
1996-97	3935	1871	14399	9552	6876	7460	0.75	1749	1454	0.83
1997-98	3868	1875	14353	8850	7138	8137	0.74	1988	1803	0.91
1998-99	3519	1617	12762	7736	8715	10552	0.80	2180	1988	0.91

Source: Bangladesh Bureau of Statistics.

Table 4: Production of Rice & Wheat in Japan (flat area).

Period	Rice			Wheat		
	Area in '000' acre	Production in '000' tons	Yield per acre (tons)	Area in '000' acre	Production in '000' tons	Yield per acre (tons)
1975	6716	13085	1.95	222	241	1.09
1980	8505	9692	1.67	472	583	1.24
1985	5725	11613	2.03	578	874	1.51
1990	5076	10463	2.06	642	952	1.48
1996	4858	10328	2.13	393	478	1.22
1997	4802	10004	2.08	390	573	1.47
1998	4429	8939	2.02	400	570	1.43

Source: Statistics & Information Department, Ministry of Agriculture, Forestry and Fisheries, Japan.

⑤ Comparative Cost of Production Between Cooperative Farming and Individual Farming in Japan.

Reduced production cost is an important means of stabilizing the prices of agricultural products and increasing the income of the farmers. In this section, the production costs of cooperative farms are analyzed in comparison with those of individual farms. The results show that in Japan the total production cost of rice of cooperative farms is comparatively lower from the previous year than those of individual farms. In the case of cooperative farming, in 1999, total material and labor cost were 1,03,203 yen and in 2000, they were 1,00,151 yen. Here material and labor costs

Table 5: Production Cost of Rice (Cooperative Farms)

Item	Labor Cost				Material Cost	Total Cost		
	Total		Direct Labor Cost	Indirect Labor Cost		Total	Purchase (Paid)	Self-supplied
	Constituent							
2000 (Production)	35396	29225	33975	1421	64755	100151	55454	32599
1999 (Production)	36870	31184	35346	1524	66333	103202	55631	34936
Difference to Previous Year	-4.0	-6.3	-3.9	-6.8	-2.4	-3.0	-0.3	-6.7

Table 6: Production Cost of Rice (Individual Farms)

Item	Labor Cost				Material Cost	Total Cost		
	Total		Direct Labor Cost	Indirect Labor Cost		Total	Purchase (Paid)	Self-supplied
	Family							
2000 (Production)	53103	51195	52291	1812	79116	132219	55461	51900
1999 (Production)	54810	52896	52965	1845	80528	135338	56034	53609
Difference to Previous Year	-3.1	-3.2	-3.2	-1.8	-1.8	-2.3	-1.0	-3.2

Note: Production cost per 10a, Unit value ratio of decrease: %. Yen unit.

Source: Preliminary Statistical Report on Agri, Forest and Fisheries, 2000, Ministry of Agriculture, Forestry and Fisheries, Japan.

were reduced from the previous year by 3%. On the other hand, in individual farming, in 1999, total material and labor cost were 1,35,338 yen and in 2000, those costs were 1,32,219 yen. Here, material and labor costs were reduced from the previous year by 2.3%. Analyzing both the figures, it is clearly found that total cost of cooperative farms is also lower than that of individual farms.

⑥ Meaning of Group Farming

We consider group farming as an organization in which the bulk of the land is held and farmed in common by the group. The type of group farming referred to here is what is commonly called a production cooperative whose aims are to work together, the joint use of machines or facilities, agreement on farming work and so on. At any rate, group farming is an organization of solidarity, economy and humanity, aiming at a better level of farming (Takekazu, OGURA, 1982). Group farming is organized by farmers in order to get the advantages of a large operation, lower cost of production, more effective use of land, manpower, capital and consequently higher economic returns. For certain types of high cost indivisible technologies, it is much more economical to adopt these on a large farm than on a small farm. Therefore, farmers join their resources of capital, land and manpower in order to produce more cheaply. Sometimes individual farming may be capable of adopting new technology such as the high yield-yielding varieties of seed and the related inputs provided they have access to such strategic variables as credit and water. But a highly productive individual farming system requires an elaborate service structure, which is both expensive and time-consuming to develop. In a group farming system all participating farmers have to adopt

the same variety and transplant at the same time, without this timing, the adjustment of irrigation water can not be carried out cooperatively because water depth must differ by growth stage and condition. The same is true for disease and insect control. Thus the simplest form of group farming operation is agreement to adopt the same variety, to transplant and apply fertilizer at an agreed-upon time and to manage water use and disease and insect control cooperatively. Usually the operations under the agreement are carried out individually on each farm except for cooperative water management and insect control. Group farming is sometimes called joint farming; however, agreement among the members is its basic foundation.

⑦ Size of Operation

It is very difficult to say anything specific about the optimal size of a group farming. Yet of unit will have an important impact on many internal issues related to the rational and efficient operation of the farm from an economic, administrative as well as the social point of view.

Otto Schiller notes that economic/managerial considerations on the one hand and social consideration on the other involve different factors that may not always coincide with regard to any rational and manageable agricultural operation, Schiller points out that there is a lower limit determined by the nature of the working process itself, and an upper limit determined by managerial requirements (Reed, Edward P.1977). In other words; according to the peculiarities of each kind of operation, the diseconomies of small as well as large scale should be avoided. In a group farming situation social considerations such as the need for cooperative working arrangement and participatory decision-making will affect the optimum number of families the group can include. The factors determining the optimal number will be such things as the homogeneity of the group and the size of important communal institution.

⑧ Management and Decision Making

Group farming of the type we are discussing presumes that the farmer participants as co-owners share in both labor and management responsibilities. Ideally, then, members should participate to the widest extent possible in the decision-making function. An effective participatory decision-making process is of central importance if a “we-they”¹³ gap between members and managers is to be avoided and member morale sustained.

Such a decision making process assumes, of course, that the group farm has a sufficient degree of autonomy in the area of production, distribution and investment to provide a range in which meaningful decisions can be taken at the farm level. However, it is also obvious that making such decisions affecting the overall functioning of a large-scale agricultural operation and relating the farm to external institutions and economic bodies, requires a high degree of skill and sophistication as well as time. To conduct the complex job of group farming sometimes outside a professional manager may be appointed. In this case, it is very important that the farmers have a prominent role in the selection process and have the right and authority to remove the manager at any time. From the very start, preparation and training of peasant members for participation in the planning and management of the farm operation should be emphasized. Parallel with this should

¹³ Communication gap and misleading the members by managers sometimes create ‘we-they’ environment in the organization.

be a step-by-step scheduled increase in active participation, as skills and experience are gained. Government advice and assistance can be maintained through extension-type services, but within a relationship based on increasing group farm autonomy.

⑨ Remuneration and Incentives

In any group farming situation it is important that the system of remuneration reinforce the collective functioning of the institution, otherwise there is a constant tension between the ideals of the organization and the interests of the individual members. In the context of the most developing countries, however, this requirement is of special and critical importance. Though some degree of ideological commitment or simply enthusiasm for the group endeavor may exist among the peasants, it is clearly indicated that this motivation is not sufficient to hold a group together. The system of reward and the distribution of output must be designed to provide rational economic incentives for the collective production of the bulk of farm output. Obviously, then the system of remuneration must be closely coordinated with the organization and performance of labor. Payments to participants often are in the form of advances per day worked (with different rates of payment for different types of work), plus distribution net earnings at year's end after deduction of all expenses. However, guidelines regarding this matter must be determined by mutual understanding.

⑩ Group Activities in Japan

A simple definition of group activities in Japanese farming is quite impossible because of the great organizational diversity of these activities. There are many reasons for the appearance of such a variety of group activities recently; for example, the rapid outflow of labor from rural to urban areas, a remarkable increase in the number of part-time farmers, the introduction of large machinery and facilities accompanying land improvement and the provision of governmental subsidies. In particular, government policy for "agricultural structure improvement" has played a very important role in promoting group activities. However, the following classifications of group activities are found in Japanese agriculture.

a. Farmers' Production Organization:

- (i) Joint operation of farming practices
- (ii) Joint use of farm machinery and facilities
- (iii) Group farming organization
- (iv) Contract farming.

b. Cooperative Management:

- (i) Cooperative management of a single enterprise
- (ii) Cooperative management of all enterprise.

Group farming organization a (iii) requires that farmers carry out their farming practices according to certain mutual agreements. Each member of the group operates his own farm, but all members agree to use the same varieties, the same application of fertilizer in both amount and in time of application, the same treatment of agricultural chemicals etc. In Japan, group farming is divided into three sub-types:

- I Technological agreement only;
- II Technological agreement plus joint operation of farming practices; and
- III Technological agreement plus joint use of machinery.

The third type is very popular in Japan. Group farming organizations in Japan have been developed and promoted spontaneously by farmers themselves rather than by government. As a result, these organizations are very flexible. They can adapt easily to changes in the economic environment, on the one hand, and can readily disappear when no longer appropriate, on the other. It is noted that most of the group organizations are combinations of two or three of the types mentioned above.

3. Conclusion

When Bangladesh became independent (1971), about 80 percent of its population was inadequately fed. Now the level is much lower because the eradication of hunger and poverty has received a high priority in the development planning in independent Bangladesh. Until recently, high population densities and growth were regarded as the main causes of poverty and hunger. It was assumed that more people consume more and produce relatively less. But this idea began to lose a little support when several densely populated countries began to record enormous increase in food production. For example Japan, with 50 times more agricultural workers on agricultural land than the USA, produce more food per hectare than the USA. Proper maintenance of the land is one of the important factors for the increase of productivity.

Sometimes group farming is called collective farming. "Collective farms organized by Farmers in order to get the advantages of a larger operation — — lower cost of production, more effective use of land, manpower and capital etc. — — and consequently higher economic returns." (Galeski, Boguslaw, 1978).

In group farming as well as in individual farming, four factors are very important, namely land, capital, labor and management. In the case of group farming the factor of management is especially important. From the view point of management, three kinds of group farming could be distinguished. One organization is where management has more importance than capital, land and labor. Another one is where land and/or capital, namely machines or facilities are the most important. The third one is where land, capital and labor are as important as management. The first could be called a software organization, the second an organization of hardware and the third an organization of both hardware and software. The main functions of these are to accumulate knowledge, to improve technology or to collect information and to make programs. In the context of Bangladesh group farming is hardly found so that the question of both hardware and software organization can not be raised.

To assure a high yield of paddy, farmers spend many hours carrying out the crucial operation of timely transplanting and irrigation. This high yield requires carefully adjusted depth of irrigation

water, high rates of fertilization and disease and insect control. These are certain scale economies to be realized if these activities are performed jointly and on larger areas of land than that under control of an individual family. The path toward progress does not always move in a straight line (Kanazawa Natsuki, 1977, pp.321). So there are some criticisms are found on group farming mentioned below:

- a) Management of group farming organization is difficult and therefore inefficient;
- b) There is an inequality of burden or responsibility and benefit among participating farmers; and
- c) Group farming reduces the potential for developing relatively large farm under individual management.

The negative evaluations mentioned above do not always occur. Whatever criticism there may be generally, group farming can achieve a high level of both land and labor productivity.

In the discussion earlier we find that the yield rate of Bangladesh agriculture is lower than that of Japan and also find that the production cost of agriculture of cooperative farming in Japan is lower than that of individual farming. In group farming, the optimum number of farmers can easily create fund by their own subscription and spend that for buying advanced inputs. Certainly, a lot of capital is necessary to introduce the new technology in Bangladesh because technology is not only knowledge but is also in material form as chemicals, machinery and facilities. These are now some measures to provide such needed capital by raising fund, credit or subsidy but the central issue lies in the farming organization or the scale or farming rather than in technology or capital. As the characteristics of Bangladesh agriculture are individualism, low rate of farmer's literacy (literacy, 41% of total population) and their deplorable economic condition (36% of population below national poverty line, average per capita income 380 US dollar), the farming efficiency and sound management practices are hardly found. For applying modern inputs, reducing cost and enhancing productivity of agriculture, the structural reform of agriculture at production level is the crying need of Bangladesh by introducing the group farming system and for this Bangladesh can obviously take some lessons from Japanese agriculture.

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バングラデシュにおける農業基盤改善の必要性 —日本農業の生産性を参考に—

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摘 要

バングラデシュでは、80%の人々が主に農産物の生産に基盤をおく農村部に住んでいる。気象条件がまさに農産物の生産のために適合している。1971年の独立以降、農産物の生産に依存する割合が徐々に増してはいるが、それでも人口増加の割合に比べて十分なものではない。

2002年までに食糧自給率の100%達成は、バングラデシュの五ヶ年計画の第5番目の目標になっているが、その目標達成は最適な条件にうまく合致したときのみ可能な数値である。1999-2000年度と2000-2001年度のバングラデシュでは、210万4千トンの米と155万6千トンの小麦を輸入して、国民が必要とする最低限の食糧を満たしたに過ぎない。

このように、農業セクターには非常に大きい可能性があるものの、伝統的な農業生産基盤の改善を図らなくては目標値を達成することが出来ない状況にある。バングラデシュの場合、一方では人口が増加の一途をたどっているのに、他方では耕地が減少している。そのために少ない耕地で栽培して、基本的食糧の需要をより満たすために農業生産性の向上が不可欠なものになる。さらに作物の栽培活動をモニターするために何も適当な基盤がないばかりか、農業生産者の効果的な組織もない状況にある。

そこで本論文は、日本の農産物、特に米と小麦の生産性を参考に比較し、生産コストを指標にして考察したところ、バングラデシュの農業の生産基盤を改善し、グループ農業システムの導入を進めるのがもっとも優れていると指摘できた。

また本研究と先行研究から、時に共同的農業 (Collective farming) と呼ばれるグループ農業の方が個人的な農業より生産効率をより効果的に発揮できることが、明らかになった。