20. EXAMPLES IN GROUP-FARMING OPERATION AND JOINT-UTILIZATION

SENKICHIRO HAYAKAWA* and YASUO WATANABE**

Case of the Ohama town which carried out the Agricultural Structure Improvement Project for the whole community as a town program

(1) Brief description of the district

The town is located at the southern end of Ogasa-gun in the southwestern part of Shizuoka Prefecture facing the Pacific Ocean and is the most promising with high agricultural productivity. The northern part of the town is characterized by sloping upland and paddy field of diluvial soil and the central part, by paddy field reclaimed along the basin of the Kiku River. The southern part is mostly sandy upland of sea layer alluvial soil with scattered paddy field.

Ohama-cho is a town erected in 1955 by incorporating two villages along the sea coast and a village at the foot of a mountain. Agricultural land per farm household is 0.83 ha in average, and in pre-war days major farm products were rice, wheat, barley and sweet potatoes, and tea occupied some part. Soil fertility was so poor with low productivity that farmers could not get enough income.

In a post-war period agriculture of the district became diversified with the progress in technique and the change in national diet pattern. By making the most use of special features of the district, the cultivation by using green houses and vinyl-houses and special vegetables were introduced.

In 1958 under the New Rural Development Program a part of diluvial table land was reclaimed into orange orchard, and land improvement was carried out on coastal sandy uplands. At the same time the construction of shipping facilities for joint use has been promoted and the town's agricultural policy has been directed to ensure the most use of special features of the district.

In 1961 upon the enactment of the Agricultural Basic Law the town has received the designation of the First Agricultural Structure Improvement Project. And after launching upon the structural improvement pilot project the reclamation project along mountainous localities developed into the present structural improvement project for the whole community.

(2) Progress of the first project and the inauguration of group operation in paddy rice cultivation.

Upon the receipt of the designation for structural improvement in 1961, the land consolidation has been launched over 120 ha of paddy field from 1962. Various installations such as tractors and paddy drying facilities have been introduced, and vegetable culture in paddy field by using vinyl houses has been expanded in area. Pig raising has also been introduced in the southern coastal district.

At that time agricultural cooperatives played an essential part in implementing land consolidation and in introducing basic installations for agricultural modernization.

* Mechanized Farming Div., Shizuoka Pref. Agr. Exp. Sta., Miyakoda-cho, Hamamatsu-shi, Shizuoka-ken, Japan.

** Division of Agriculture and Horticulture, Department of Agriculture and Fishery, Shizuoka Prefectural Government, Shizuoka- Japan

And although there were three agricultural cooperatives in a town before the merger, those agricultural cooperatives had been apprehensive of handling a large investment in large agricultural machinery. So they introduced only the tractors of small capacity and the introduction ended in failure. In the course of promoting agricultural policy, agricultural cooperatives play a very important role, and the financial and guiding powers are absolutely necessary. So the strengthening of agricultural cooperatives has been desired for the time being. Fortunately in March, 1963, eight agricultural cooperatives in three communities, Ohama-cho, Osuga-cho and Goto-mura have been amalgamated.

In 1963, the project's second year land consolidation has been carried out on 93 ha of paddy field and it was at the same year that the launching of memorable group-farming operation has been witnessed in paddy rice cultivation.

Because the scale of land improvement was too large in one fiscal year and due to the lack of experience in designing and construction, many farmers were worried about the transplanting: for the construction work was still going on in May. During the period of construction, from April, the meetings at a subcommunity level have been repeated on land exchange, and those meetings have arrived at the conclusion that land consolidation is most essential for an effective land use and effective operation of machinery such as tractors, combines, and paddy dryers. The land exchange and consolidation program has been established by each sub-community. Thus, the group-farming program has been instituted under strong guidance from the agricultural extension office and agricultural cooperatives. It has ultimately developed into a complete group-farming operation by each sub-community. That is, each sub-community has been allocated with its consolidated lands, and all works from making of seedling bed to harvesting, threshing, hulling and marketing as well as the distribution of rice for family consumption are to be carried out by each group completely.

The district had heretofore been noted for low productivity due to 'Akiochi' disease and because of poor irrigation and drainage facilities. New group-farming system brought about the 35% yield increase above the normal crop which was indeed a real surprise to participating farmers. Farmers have come to realize the fact that such an excellent result was the manifestation of their coordinated efforts in sub-soil plowing by machinery, improvement of irrigation and drainage, uniform improvement in variety and cultivation technique and right work at a right time which was made possible by labor saved from the mechanization. On the other hand, paddy field cultivation outside the group-farming district was still under individual management as ever. Farmers who had paddy field in and out of the group-farming district employed modern farming on one hand and old type agriculture on the other, and the loss from the duplication of individual and group management such as the overlapping of capital investment became a big issue. So the administration of the community had to be directed to promote proper utilization of land by means of consolidation and proper distribution of labor throughout seasons and to correct the disparity between the farmers in the group-farming district and the non-group-farming district in order to develop the modern rual community. So the people and municipal administration have anticipated much from the next project which would entirely cover the agricultural lands of Ohama-cho.

(3) Plan for and criteria of the second structural improvement project for the whole community

In 1965 the town has received the designation for the second project and the town's desire to implement structural improvement for the whole community has been recognized.

The very first condition to receive the designation of structural improvement is to erect the rural community in which agriculture can be in harmony with other local industries; the second, definite division in land utilization for agriculture and other industries; and the third, the establishment of modern, large scale group-farming.

There are six other conditions to, such as land exchange and consolidation for the whole community upon the premise of carrying out a modern, mechanized agriculture with large machinery, and the fluidity in agricultural land and labor. Various policies and plans have been advanced to meet those conditions.

1) As for the classification of area, the allocation has been made for agricultural use and industrial use. For instance, both sides of highway have been allocated for shopping district, residential lot and factory. Central area for paddy field and areas along the foot of mountains and southern sandy areas are to be in use of agricalture and each local characteristic is expected for its right utilization.

2) As for the distribution of labor, to ensure a proper fluidity of farm labor, 2.3 persons have been planned as main labor force and the surplus labor is to be allocated to the industries which will be established in future.

3) As for the target of income, out of 1,198 households of Ohama-cho 14% has been estimated to be partly engaged in industry and commerce, and 790 households accounting for 66% of the total households as viable farming and their income targets have been set at ¥1.2 million ($3,333) a year.

Besides above, further studies are to be made in detail on production infrastructures, farm management system and the tie-up with the town's whole program.

(4) Results of the projects

The total investment in the first and second projects amounted to ¥1.425 billion ($3.96 million), an average of ¥1.2 million ($3,333) per household. Besides, as a related project various installations such as country elevators and joint shipping facilities for melon and tomatoes have been constructed by agricultural cooperatives, and various programs for the improvement of agricultural production infrastructures and for the rationalization of marketing have been completed.

Group-farming in the whole community was a great success. 29 groups with 1200 farm households in 3 districts carried out joint-farming operations on 405 ha of paddy field.

Basic farm management was to organize sub-community group with 30 ha as a unit which can carry out group farming by itself on the basis of the overall program of the municipal agricultural control center. Commissioned operation system was adopted by using large machineries of agricultural cooperatives. Necessary labors and expenses for farming operation were allocated by acreage of each household.

Mechanized transplanting system was adopted for the time being. That is; plowing, paddling and pests control were carried out by large tractors; harvesting by large combines; drying and hulling by country elevators; but transplanting mostly by hands. In 1969 this farming system required 114.9 persons per ha which did not save the labor much. But it is expected to make a more progress along with the use of transplanting machines and the adoption of a direct sowing method. For the time being the most pressing problem is the establishment of a direct sowing system by using large machines in a large field lot of heavy clay soil, or a combined system of large tractors and small type transplanting machines. The increase in yield has been definitely proven although there was some yearly fluctuation, and the disparity among the areas has been decreased. Uniform varieties respectively for early, medium and late maturity have been adopted by giving consideration to the operation schedule of rice centers or country elevators.

Such a complete group-farming operation as witnessed in paddy rice cultivation has contributed very much to the promotion of other production sectors such as the expansion of vinyl-house-cultivation using paddy fields and the upbringing of a group-operation system in tabacco cultivation using upland and paddy fields. Moreover, the improvements have been realized in production with highly diversified plan as witnessed

in the planned production and marketing of watermelon in an upland district, joint operation of orange cultivation and the construction of an upland irrigation system.

On the other hand, there arises the necessity for the further improvement of irrigation and drainage facilities and the renewal and improvement of agricultural installations. And there are also many difficult problems in connection with the progress in group-farming operation such as the adjustment of the labor-input for group operation and individual management, the establishment of production and marketing systems and price stabilization measure. Together with the solution of such problems the upbringing of farm successors is a very important issue to ensure the best result in group-farming operation in which a large investment has been made to ensure the utmost use of agricultural production infrastructure.

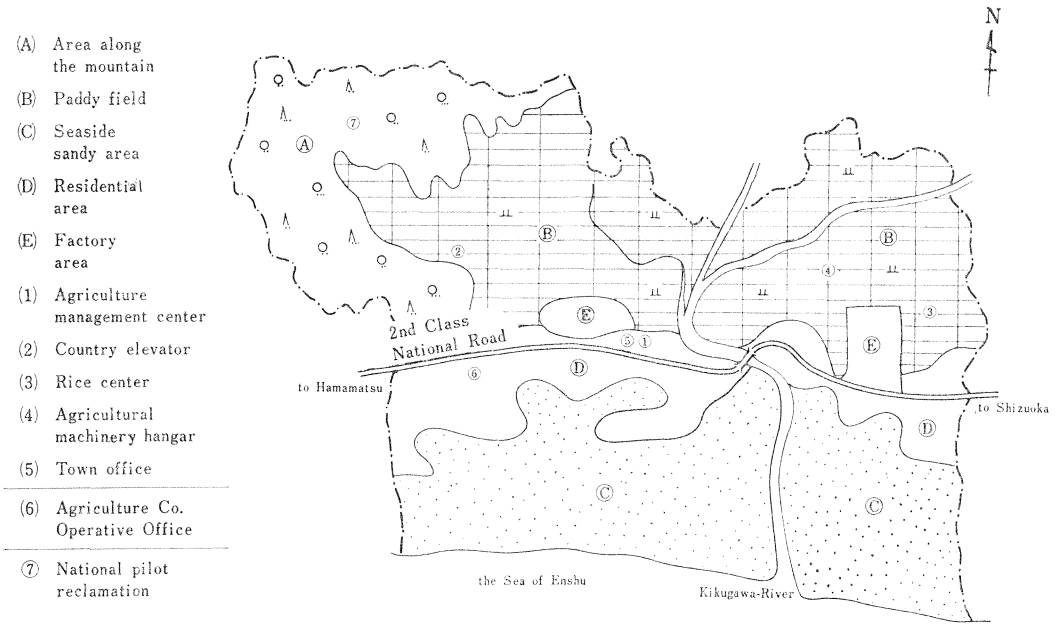

Fig. 1. Ohama-cho town enforcement plan for Agricultural Structure Improvement Project

Number of farm households (Ohama-cho)

Item / Year	Total	Number of farm household classified by full-time & part-time			Number of farm households by size of cultivating area					
		Full-time farm household	Part-time farm household mainly engaging in farming	Part-time farm household mainly engaging in other jobs	Less than 0.3 ha	0.3–0.5 ha	0.5–0.7 ha	0.7–1.0 ha	1.0–1.5 ha	1.5 ha
1955	1275	711	362	142	222	186	189	326	326	26
1965	1198	494	348	356	191	152	152	302	336	45
1970	1114	355	358	401	161	163	455		268	66

Outline of the blocks (Ohama-cho)

Item / Region	Name of district	No. of farming group	No. of farm	Acreage of paddy field	Average acreage per household
	Chihama	10	544	197.72 ha	0.363 ha
	Ohsaka	14	389	142.58	0.366
	Mutsuhama	5	373	66.19	0.242
	Total	29	1206	406.49	0.387
Average per group			41	14.0	

Income and expenditure of rice cultivation in Ohama-cho

(per 0.1 ha)

Year	Yield of rice	Gross income	Production cost			Labor input	Income per working day
			Materials	Hired labor	Total		
	kg	yen	yen	yen	yen	man day	yen
64	436.6	41,150	12,810	11,205	24,015	15.78	1,796
65	340.3	35,506	13,255	9,219	22,640	11.43	1,947
66	445.1	53,047	15,618	14,401	28,875	15.66	2,390
67	407.8	50,985	15,980	14,790	30,771	14.65	2,632
68	428.8	55,804	18,025	15,066	33,091	12.61	2,993

Disposal of surplus (Case of Ohama-cho)

Total results (1)−[Cost of production (2) + Land rent (3) + Reward for officers (4) + Reserve fund (5)]=Surplus disposal

(1) Total receipt consists of the receipts of products and other miscellaneous revenue.

(2) Cost of production consists of the costs of materials, labor, management, etc.

(3) Land rent includes taxes and other duties, and is defined to be less than about 8,000 yen per 0.1 ha.

(4) Reward for officers differs in different size of the managing area and different composition of officers but is limited to 1,000–2,000 yen per 0.1 ha.

(5) Reserve fund is expected to be about 500–1,000 yen per 0.1 ha.

Disposal of surplus is as follows:

30–40% as land rent

70–60% as wages according to labor input

Reward for officers is culculated by standard rates as in the following:

Chairman	50	Chief	25
Vice chairman	30	Group leader	10

Calculation formula for example

Size of the block 30 ha

Composition of the officers:

Chairman 1, Vice chairman 1, Chief 3, Group leader 5,

Reaward for officers

Assuming 2,000 yen per 0.1 ha, reward will be 600,000 yen in total.

Items of production cost for materials

(in Yen per 0.1 ha)

Year	Seed	Fertilizer and manure	Agricultural chemicals	Agricultural Implement					Water charge	Office implements	Allotted charge	Misscel-laneous	Total
				Tractor	Sprayer	Combine	Rice center	Others					
64	301	2,903	1,238	3,077	170	—	1,518	3,020	350	400	600	468	14,045
65	497	3,045	1,429	2,919	461	869	1,330	1,198	370	227	616	421	13,538
66	499	3,635	1,787	3,273	596	153	2,009	900	357	921	630	945	15,618
67	367	3,852	1,930	3,100	451	407	2,162	1,121	396	1,881	780	275	15,981
68	470	8,606	2,504	3,518	496	871	1,996	910	256	2,074	848	396	18,025

Chairman	rate 50	total rate 50	
Vice chairman	30	30	
Chief	25	75	(25 × 3)
Group leader	10	50	(10 × 5)
Total		205	

1 rate: 600,000 yen ÷ 205 = 2,926 yen

Chairman	2,926 yen	×	50 rate	=	146,3000 yen
Vice chairman	2,926	×	30	=	87,780
Chief	2,926	×	25	=	73,150
Group leader	2,926	×	10	=	29,260

Case of Hosoe-Nakagawa 9th District which has undergone a highly mechanized group cultivation of paddy rice

(1) Brief description of the district

Hosoe-cho is located in the western part of Shizuoka Prefecture, facing the Hamana Lake, and the town's southern part borders on the city of Hamamatsu. The Nakagawa district, a paddy rice belt of alluvial soil, is reclaimed along the basin of the Miyakoda River which is running through the town from east to west into the Hamana Lake. The district forms a collective paddy field of about 600 ha. It is divided into 10 sub-districts and the 9th district is located on the southern bank near the river mouth of the Miyakoda River.

There are fifty-three farm households in the 9th district which possesses paddy field acreage of 25.4 ha, orange orchard of 12 ha. An average of farm labor population there, is 1.1 men and 1.1 women per household. Paddy rice production is the mainstay of farm management with the majority of farmers combining paddy rice cultivation with rush crop and orange growing. Many farmers of the district are particularly interested in paddy rice cultivation.

(2) Inauguration of the 9th District mechanized rice cultivation cooperative

The decrease in local labor force and the increase in acreage of orange growing in parallel with annual economic growth of Japan have brought about conditions unfavorable for rice cultivation in traditional ways. So there was a strong indication toward the promotion of group-farming operation by introducing the machinery to save labor and to ensure a stabilized high yield.

By chance upon the inauguration of the Group Cultivation Promotion Project in 1967, the district has received the designation and the operation body has been instituted by the effort of Mr. Uchiyama who is now the Chairman of the cooperative.

(3) Inauguration of paddy rice group cultivation

72 farm households participated in a group cultivation system, out of which 32 households were full-time farmers, 21 were part-time farmers with major income from the farming and, 19 part-time farmers with major income from non-agricultural occupation. The paddy field of the group was 30 ha in acreage and average holding per household was only 0.4 ha.

Before the inauguration of a new farming system the sub-community has already introduced 35 small tractors, pest control machines and threshing machines. Although the mechanization was realized in plowing, paddling, pest control and threshing but all those operations were carried on entirely by individual. Varieties and practices of water management and pest control were diverse, sometimes lacking the appropriateness.

In March, 1968, 1 large tractor, 1 medium tractor, 2 rotary tillers, 4 hand transplanting machines, 1 power sprayer directly-attachable to a tractor and 1 binder were introduced. And from 1968-planting the unification of varieties was adopted for the first time. Up to that time there were 20 varieties, but under the unification the number

of varieties was reduced to 5. Transplanting of the soil-attached seedlings by machines was encouraged and carried out as much as possible and various operations from the disinfection of seeds to the raising of seedlings, pest control, water management and hulling have all been carried out jointly by groups and the operations in transplanting, fertilizer application, weeding and threshing were carried by individual but in same measures.

The result was a great success. The labor requirement for paddy rice cultivation per ha, which was 1,440 hours heretofore, was reduced to 800 hours, and the yield was 5.3 tons in brown rice per ha while the yield of neighboring farms was 4.2 tons. Also, mechanical-transplanting cultivation by using hand-driving machine was tested on 8 ha in 1967. Making the best use of the experience, the acreage was increased to 14 ha in 1968 and the result was quite successful. In case of mechanized transplanting rice seedlings are jointly grown in green houses from sowing up to transplanting. In 1969 addition green houses for hardening of seedlings were constructed in order to ensure the uniformity of growth of seedlings, and mechanical-transplanting was carried out on 17 ha. This year, 1970, hand transplanting machines were changed to powered machines and mechanical-transplanting was carried out on 20 ha.

Moreover, from last year, in place of sprayers which require so many operators, pipe-dusters have been introduced. Threshing operation after the binding has been improved to automatic threshing machines which are directly attachable to tractors.

(4) Problems to be confronted in future

As stated above, group farming by joint operation under mechanization has brought about a far reaching result more than had been expected. The labor was saved by half and yield increase was more than 20%. At first there was a dissatisfaction with group farming on the part of veteran farmers, but when they saw the decrease in individual differences and the overall-levelling-up their skepticism has disappeared. Particularly, women of the community are happy because their labor has been reduced so much that they can have wider latitude in their home livings.

However, in order to meet the impact of ever-growing economy on the production scale, there remains many problems for further study on rationalization. And some of rice centers and the utilization of surplus labor. Fortunately, there are young farm successors who have the faith in group farming and much is expected from those youths to achieve further results by making use of local conditions.

Group-cultivation record (Nakagawa 9th District)

● ..... Joint operation, ○ ..... Individual but under instructions, × ..... Individual

	Operation	Initial Blan's target			1968 record		
		Kind	No. household	Acreage	Kind	No. household	Acreage
Unification of operation	Seedling raising	●	72	20	●	60	14
		○	50	10	×	68	16
	Plowing				●	62	25
		●	72	30	×	10	10
	Paddling				●	40	8
		●	72	30	×	45	22
	Basic dressing	○	72	30	○	72	30
	Transplanting	○	72	30	○	72	30
	After dressing	○	72	30	○	72	30
	Water management	●	72	30	●	72	30
	Disese & insect control	●	72	30	●	72	30
	Weeding	●	72	30	○	72	30
	Harvesting	●	20	10	●	50	9
		×	52	20	×	70	21
	Threshing	×	72	30	×	72	30
	Drying	×	72	30	×	72	30
	Hulling	●	72	30	●	72	30
Unification of materials	Seed	●	50	15	●	50	15
	Fertilizer	●	72	30	●	72	30
	Agr. Chemical	●	72	30	●	72	30

Use of machineries by year (Nakagawa 9th District)

Machineries	Type & size	No.	Year introduced	1968		1969		1970	
				Hours used	Acreage used	Hours used	Acreage used	Hours used	Acreage used
Rotary tiller	Width : 1.35m	1	1967	325	25 ha	496	30 ha	260	20 ha
〃 〃	Width : 1.52m	1	1967	148	14	124	21	148	14
Seedling raising unit by electric-heating	For 0.5 ha	2	1967					480	20
	For 1 ha	2	1968						
Green house for hardening	30m²	1	1968					144	20
Transplanting machine	By hand, 1 row	4	1967	560	14	500	17	320	20
	Powered, 2 row	2	1969						
Sprayer	Attachable to tractor, 400 liter	1	1967	36	60 (in total)				
Duster	Knapsack type, with 30m hose	1	1969			125	150		
Reaper	Power binding type, 3 rows	1	1967	180	9	220	11		
Thresher	Attachable to tractor	1	1969			120	5		
Tractor	23 ps	1	1967						
Tractor	45 ps	1	1967						