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A Comprehensive Assessment of the Agricultural Extension System in the Philippines: Case Study of LGU Extension in Ubay, Bohol

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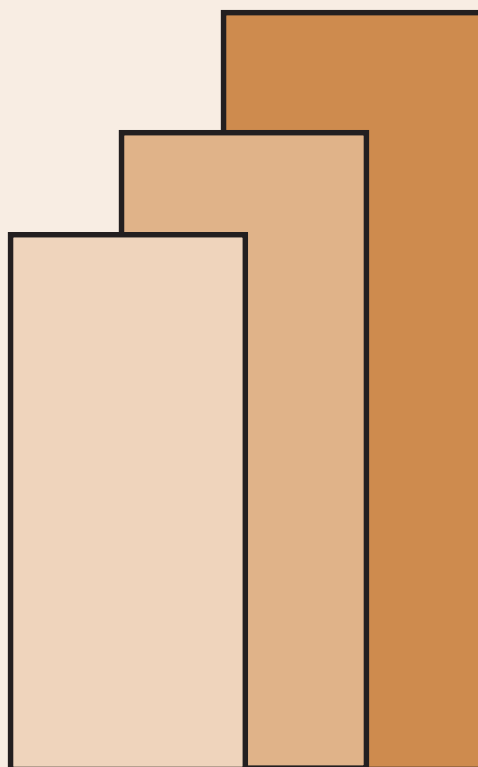
**A Comprehensive Assessment
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Efren B. Saz

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**A COMPREHENSIVE ASSESSMENT OF THE AGRICULTURAL EXTENSION
SYSTEM IN THE PHILIPPINES:**

CASE STUDY OF LGU EXTENSION IN UBAY, BOHOL

EFREN B. SAZ

**Institute Of Strategic Research And Development Studies
Leyte State University**

2005

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Abstract

Using intensive interviews and observations and secondary data the study looked at a local government agricultural extension service. It situated the context by describing the agroclimatic, social and economic conditions of the area including its problems, potentials and prospects. It also took a closer look at two promising industries in the locality—rice and mango production. The study further took a closer look at the local government agriculture extension service in terms of the nature of services offered viz a vis the needs of the clientele specially of the two industries in focus. An assessment of the service's resources, competencies, adequacy, timeliness and quality was also done. Lastly, the study looked at knowledge management using a framework suggested by Dalkir and provided suggestions as to how a poorly equipped agriculture extension service provider such as the Ubay LGU may introduce the concept of knowledge management to make the service more effective and responsive to the peculiarities of the area and people.

Ubay is a growing agricultural and commercial area in the northeastern side of Bohol province. It had the largest area devoted to rice and mango production in the entire province. Various programs in agriculture had been implemented in the area and various agencies of government were located in the municipality. Land holding was generally small with a few exceptionally large farms. A greater part of the rice production areas was rainfed although a current irrigation expansion project would quadruple the present coverage thus promising a substantial increase in rice production all other factors being present. Mango also provided a substantial source of income for many but the industry's prospects seemed mixed due to the vulnerability of the industry to various threats such as pests and diseases including the vagaries of the market and the very high demand for production inputs.

The local extension service was inadequate to provide the multifarious demands of its clients. The number of regular staff had declined although replacements had been recruited. The usefulness of the replacement staff, however had been restricted in the sense that they were not fully given field tasks as a result of their employment status. Extension activities consisted of farm advisory services, farmers' classes and training, farm organizing, farm demonstrations, pest and disease monitoring and facilitating services. Activities generally dominated programs and a long list of activities for the year indicated a holistic approach with almost unclear priorities. Staff tasking and the organizational structure was patterned after the national program priorities in cereals, livestock, fisheries and high value crops. Staff compensation and incentives were relatively better than other LGUs although opportunities for promotion and career advancement were nil. Staff morale and group cohesion was generally high despite the heavy work load but they felt they needed more support in terms of mobility and competency enhancement such as technical training and information materials.

Knowledge management was unsystematic. Knowledge creation was hardly done since the service was not designed for this activity. Occasionally, however, staff were involved in research type activities such as varietal testing and technology demonstration (technodemo). Knowledge capture relied mostly on opportunistic activities such as presented by attendance to occasional training or conference or availability of reading material or personal encounter with experts/researchers. These knowledge, however,

were not stored in a systematic manner where retrieval would be easy. Electronic means of storage was not resorted to even with the presence of a computer. It was observed that the level of knowledge of the staff on specific subjects were not similar indicating that some were more knowledgeable than others. This was due to the specialization of tasks and particular staff had to concentrate on certain specialized knowledge. Varying ages, education and training and extension experience generally accounted for the differences in knowledge level.

Knowledge sharing was often done among staff but most of this was done informally. The recommended sharing mechanism such as echo seminars were not resorted to as a matter of procedure. Knowledge application was done both in the staff's own farms and among farmer clients. Owing to the many inadequacies of the service, differences in production environments and farmers' resource capacities farm practices varied considerably resulting to wide variations in yields.

It was recommended that the local extension service adopt a knowledge management approach. Knowledge capture must be made systematic and an organizational repository that is accessible to all staff must be put up manually and electronically where applicable. Staff should be allowed time and resources to tap the internet for new knowledge. These, in turn, must be complemented by a systematic search for local best practice for applicability and appropriateness. The staff should also establish and mediate communities of practice using the various communication gadgets and strategies available in the area.

Key words: Ubay, Rice Industry, Mango Industry, Municipal Agriculture Office, Knowledge Management, Local Agriculture Extension Service

CHAPTER 1 INTRODUCTION

Rationale

Agricultural Extension was one of the services devolved by the national government to the local government units (LGUs) more than ten years ago. One of the main rationales for the devolution was that LGUs were supposed to be better managers of extension services due to their familiarity with the local conditions of agriculture; hence, they could tailor their services well to their local needs. Periodic assessments of the devolution process pointed to recurrent problems such as the mixed attitude of LGUs towards devolution, the inability of the local governments to manage extension services, as they ought to and the disproportionately low budgetary allocations devoted to agriculture services.¹ These problems notwithstanding do not necessarily indicate that extension is less effective after devolution than before.

The effectiveness of extension services be it devolved or centralized greatly depends on its management. In addition, the staff who are supposed to carry out this important function must be competent in both content and methodology of communicating to and teaching adults: farmers, fisherfolk, processors, etc. Furthermore, extension staff, to be effective must have the necessary facilities and equipment in order that the teaching/communication process will achieve its desired end—agricultural modernization.

Objectives

The general objective of the study was to describe and analyze the structure, conduct and performance of the Philippine agricultural extension system, particularly the local government extension services in order to provide

¹ See various reports of the Rapid Appraisal of Decentralization prepared by the Local Development Assistance Program from 1992-1997. For an analysis of the allocations for agriculture and natural resources, see Cristina David, et. al.,

bases for design of policy and institutional reforms needed to strengthen research, development and extension.

Specifically, the study sought to:

1. Analyze the structure of the agriculture sector and its performance after the devolution in a municipality;
2. Document the community agriculture knowledge system;
3. Analyze the dynamics in the provision of agricultural extension services in the study site;
4. Assess the performance of agricultural extension services;
5. Draw lessons and policy recommendations

Methodology:

The study was focused on the municipality of Ubay, Bohol. The selection of Ubay, Bohol was based on a set of criteria decided upon by the project team, which included the following:

- Clear evidence that the agriculture industry has changed over time brought about by an innovation or a new technology
- A municipality where “evidence of agriculture growth” was clear
- Growth in the major crops/agricultural commodities and the role of technology

Data gathering was done using key informant interviews, group interviews, opportunity interviews, secondary data and participant observation. Various sources were consulted including documents from various projects and agencies present in Ubay including reports of previous studies conducted in the area by various researchers. Maps and other geophysical data were taken mostly from the municipal Comprehensive Land Use Plan (CLUP). Census data including population and housing, agriculture, family income and expenditures (FIES) for various years were extensively used. Key informants included the Municipal Mayor, Treasurer, Municipal Agrarian Reform Office Personnel, Municipal

Agriculture Officer and Agricultural Technologists, farmer leaders, personnel of other agencies stationed in Ubay such as the National Irrigation Administration (NIA), Bohol Experiment Station (BES), Central Visayas Integrated Agricultural Research Center (CENVIARC), Non-government Organizations (NGOs), farmers and barangay officials.

Chapter 2

THE SETTING: UBAY, BOHOL

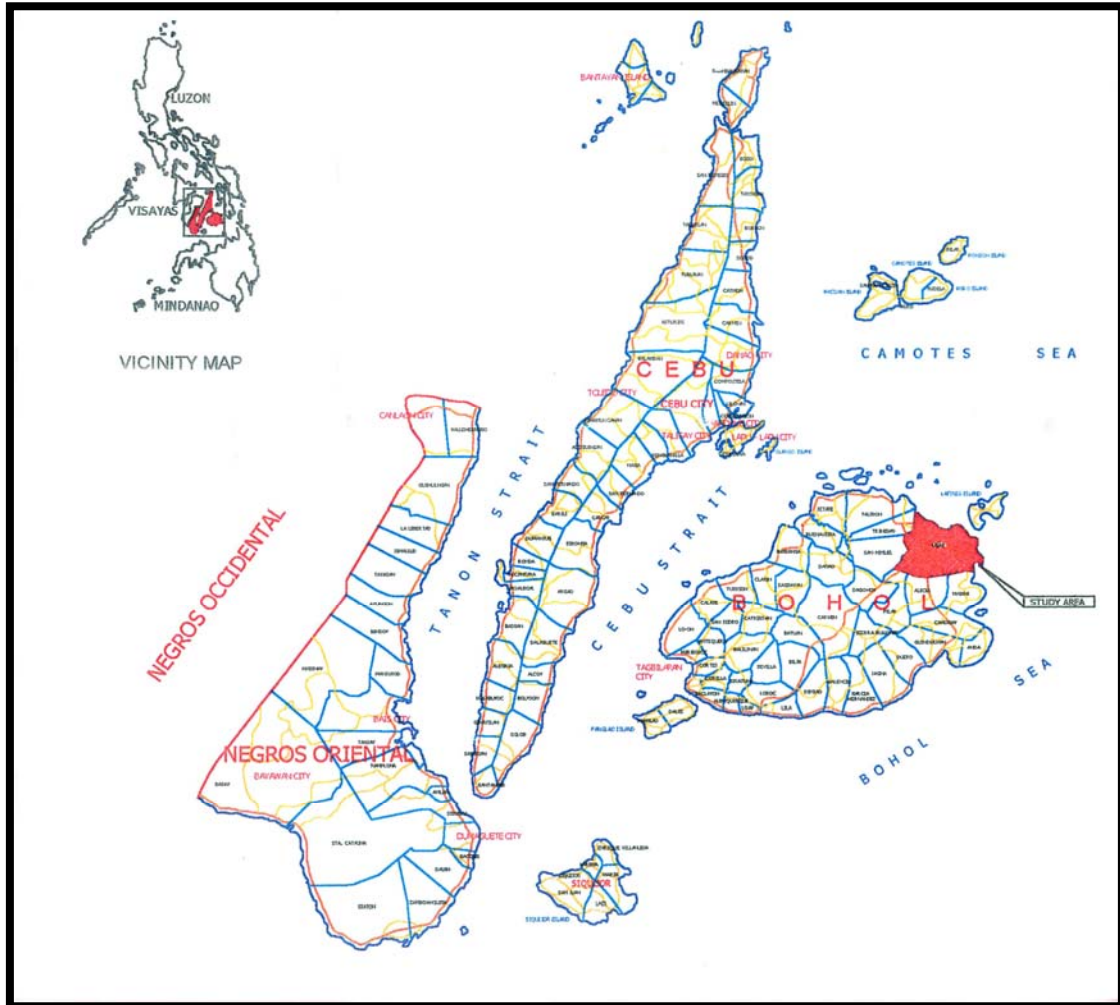
In order to have some understanding of the conditions in the Philippine setting under which agricultural extension operates, it is useful to look at a specific case using a municipal local government. Under the present political structure, certain government services that used to be provided by the national government had been devolved to the local government units, agricultural extension being one of them.² A careful examination of the social, economic, political and biophysical conditions would certainly help to enlighten any analysis of the operations of agricultural extension. This important background will also enable the observer to see if the providers and consumers have utilized their knowledge of the conditions in making choices in terms of what and how to provide and the consumers on what and how to utilize knowledge that is provided and those that were not provided but accessible through other means.

The choice of Ubay as a case in point must also be explained briefly. There were criteria used to pinpoint areas for study as mentioned above. Furthermore, it was observed that Ubay had a significant agricultural transformation resulting to increased productivity and the diversification of agriculture to various major crops and enterprises. Over the years, Ubay had demonstrated significant improvements in its agriculture and there seems to be a quickening of the pace of rural development due to various developments in infrastructure, mainly irrigation, roads and ports that apparently increased the volume of trade and commerce and the existence of many agencies and their programs in its jurisdiction.

Brief History and Location of the Municipality

Ubay is a port town in the northeastern coast of Bohol. It is an old settlement that was formerly under the jurisdiction of the Municipality of Talibon. It was elevated on September 1, 1847 as a civil town by the Spanish friars. On

January 15, 1876, the Municipality of Ubay was established as a separate parish from the cabecera of Talibon. It is now the biggest municipality in the province in terms of land area and population, second to Tagbilaran City, the capital of the province.



Source: CLUP

Fig. 1. Map of Region 7 and Bohol showing the location of Ubay.

Ubay is also becoming the granary and trade hub in the northeastern part the province. It boasts of a large area devoted to rice and a growing mango enterprise. It is also a major fishing area. Small and commercial fishery enterprises abound in the coastal settlements. The business sector had also

² The provisions in the local government code of 1991 specify the roles of the municipal governmental units in agricultural services. A detailed list is found in the appendix.

picked up with the improved infrastructure and the growing traffic in goods and passengers from Cebu and Leyte. It is also the home of major research stations of the Department of Agriculture. Major infrastructures were put up in the area such as the two small and large irrigation systems and the power installations that cross the sea via undersea cables from Leyte.

Demographics: Population Size and Growth

Population History. The population of the Municipality of Ubay during the first censal year in 1903 was 7,355. It grew to 21,213 in 1939 growing at a rate of 4.6 percent. The population continued to grow but decreased from 34,090 in 1960 to 32,717 in 1970 due to the creation of the island Municipality of Pitogo, now Carlos P. Garcia, a former barangay of Ubay. After 1970 the population constantly grew and from 1995 to 2000 its growth rate was relatively high at 3.35 percent, higher by 1.13 percent than the provincial growth rate at 2.22 percent. Ubay's population was 5.26 percent of the total population of the province of Bohol; 1.05 percent of the total population of Central Visayas (Region 7); and 0.08 percent of the total population of the Philippines (Table 1). By 2012, the population is expected to reach 88,819. Other projections are shown in Appendix Table 1.

Table 1. Population growth in Ubay, 1903-2000.

Year	Population	Increase or Decrease	Ave. Growth Rate (%)
1903	7,355	-	-
1918	8,255	900	0.77
1939	21,213	12,958	4.60
1948	29,961	8,748	3.91
1960	34,090	4,129	1.08
1970	32,717	(1,373)	-0.41
1975	34,195	1,478	0.89
1980	38,289	4,094	2.29
1990	48,902	10,613	2.48
1995	50,745	1,843	0.74
2000	59,827	9,082	3.35

Source: Ubay CLUP & NCSO

Household Size. The households in Ubay were generally similar in size to the rest of the population of the country with an average size of 5.19. The households, which were headed by younger household heads of ages below 20, had the smallest average size of 2.85 while those headed by household heads 40-49 years old had the biggest average size of 6.36. This age group also comprised the biggest number of households. Among household sizes, households of eight or more members comprised the highest percentage for all age groups (Table 2).

Table 2. No. of households by age group of HH head and household size, 2000.

Age Group	Total HH	HH size								
		1	2	3	4	5	6	7	8	Ave
All	11,512	413	1138	1552	1855	1820	1541	1238	1955	5.19
<20	41	3	13	19	2	2	1	1	-	2.85
20-29	1472	2	164	360	432	273	141	47	33	4.07
30-39	2913	36	118	282	461	609	544	404	459	5.54
40-49	2672	41	106	201	290	387	421	400	826	6.36
50-59	2001	64	171	263	323	287	244	228	421	5.46
60-69	1413	99	273	246	225	171	137	108	154	4.35
70-79	773	112	222	145	97	65	38	41	53	3.49
80<	227	36	71	36	25	26	15	9	9	3.32

Urban and Rural Household Population. There were 13,060 persons or 21.86 percent of the total population who lived in eight barangays considered urban while 46,691 persons or 78.14 percent of the total household population resided in the rural area. The most heavily populated barangay was Barangay Poblacion (town proper) with 3,418 persons followed by Barangay San Pascual with 3,015 persons while the least populated areas were Barangay Los Angeles with 213 persons followed by Barangay Camali-an with 454 persons (App. Table 2).

Age and Sex Structure. The sex distribution of the population in 2000 revealed that there were slightly more males than females. Table 3 shows that

there were 45.15 percent children and youth, ages (0-14 years); 50.29 percent were in the working age group (15-64 years); and 49.71 percent dependent population with ages below 5 years and above 64 years old. More than half (58.21%) of the population was below 25 years old (Table 3).

Table 3. Population by sex and age group, 2000.

Age Group	Both Sexes	Male	Female
All ages	59,827	30,432	29,395
Under 1	1,879	941	938
1-4	6,561	3,306	3,255
5-9	8,331	4,351	3,980
10 - 14	8,023	4,079	3,944
15 - 19	6,236	3,312	2,924
20 -24	4,777	2,439	2,338
25 - 29	3,811	1,953	1,858
30 - 34	3,756	1,863	1,893
35 - 39	3,234	1,663	1,571
40 - 44	2,959	1,523	1,436
45 - 49	2,355	1,198	1,157
50 - 54	1,959	972	987
55 - 59	1,759	855	904
60 -64	1,349	656	693
65 - 69	1,081	511	571
70 -74	820	384	436
75 - 79	494	238	256
80 and over	443	188	255
0-17	28,760	14,782	13,978
18 & above	31,067	15,650	15,417

Source: NCSO

Literacy Rate. Of the total population of Ubay in 1990, 91.02 percent were literate while 8.98 percent were illiterate. There were more literates in the urban areas compared to the rural areas. This was probably due to the proximity of the urban population to educational facilities. The most commonly completed level was the elementary, specifically from Grades 1-4 only (App. Tables 3 & 4).

Labor Force. Labor force or the economically active population refers to the population 15 years old and over who are either employed or unemployed. The economically active population of Ubay in 1990 was 55.89 percent while those not in the labor force was 44.11 percent. Of the economically active labor

force, 80.86 percent were employed and 19.14 percent were unemployed (App. Table 5).

Migration. Out of the household population 5 years old and over in 2000, 94.8 percent lived in Ubay implying a very low out migration trend (Table 4).

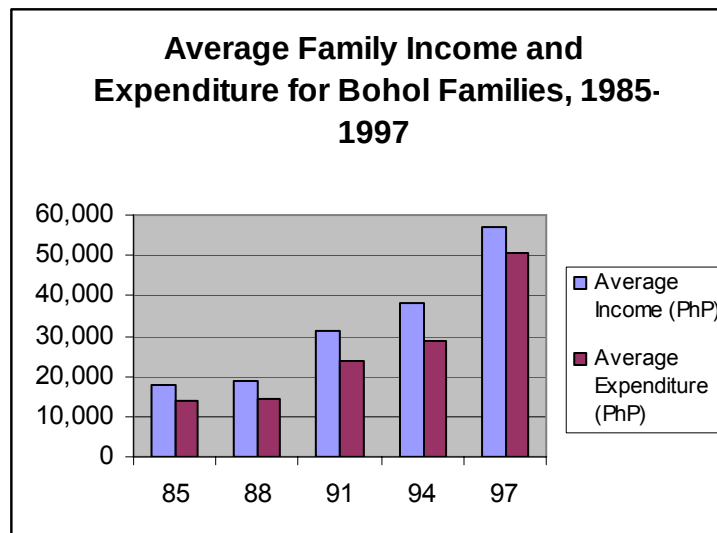
Table 4. Population 5 yrs. old and over by sex, residence at present and 5 years ago, 2000.

Sex	Pop. 5 Yrs. Old & Above	Place of Residence									
		Same Mun.	%	Other Mun. Same Prov.	%	Other Prov.	%	Other Country	%	Un-known	%
Both sexes	51,312	48,654	94.8	525	1.02	1,405	2.74	14	0.02	714	1.4
Male	26,130	24,762	48.3	271	0.53	758	1.48	10	0.02	329	0.64
Fem	25,182	23,892	46.6	254	0.49	647	1.26	4	0.01	385	0.75

Source: NCSO

Social and Economic Indicators

Family Income and Expenditures. Data for average income and expenditures of families in Bohol show that both rose over the years but a dramatic increase was noticed between the years 1994 and 1997, which shows a probably much better general economic condition during the said period. However, figures for both income and expenditure for the years mentioned were still too low (Fig. 2 and App. Table 5). The national and regional average income for 1994 was P83,161.00 and P57,579.00 pesos, respectively while that of Bohol for the same period was P38,187.00 . Notice that the 1997 average income of P56,940.00 for Bohol was still lower than the 1994 figures for the Philippines and Region 7. These data only confirmed that Bohol was one of the poorest provinces in the whole country with 47.3 percent of its families and 53.6 percent of its population living in poverty in 2000. The 2000 picture for Bohol was worse than in 1997 and worse than the whole of Region 7 and the country in general (Table 5).



Source: FIES, NSO

Fig. 2. Average family Income and expenditure of Bohol families, 1985-97.

Table 5. Poverty incidence, Philippines, Region 7 and Bohol, 1997 & 2000.

	Annual Per Cap Poverty Threshold (P)			Incidence of Families (%)			Incidence of population (%)		
	1997	2000	Inc/Dec	1997	2000	Inc/Dec	1997	2000	Inc/Dec
Phil.	9,843	11,605	17.9	28.1	28.4	0.3	33.0	34.0	1.0
Reg. 7	7,885	9,791	24.2	29.8	32.3	2.4	34.7	37.4	2.8
Bohol	6,993	9,125	30.5	37.3	47.3	9.9	43.1	53.6	10.5

Source: NSO

Bohol had one of the lowest food thresholds in the country in 2000. The Philippines needed P39,145.00 pesos per family of 5 per year for food or an average of P107.31 per family per day or P21.46 per person per day while Bohol needed only P17.34 pesos per person per day. Yet its rate of change between 1997 and 2000 was higher than the country and region at 19.1 percent. Comparative food thresholds are shown in Table 6.

Table 6. Food thresholds³ for Philippines, Region 7 and Bohol, 1997 & 2000.

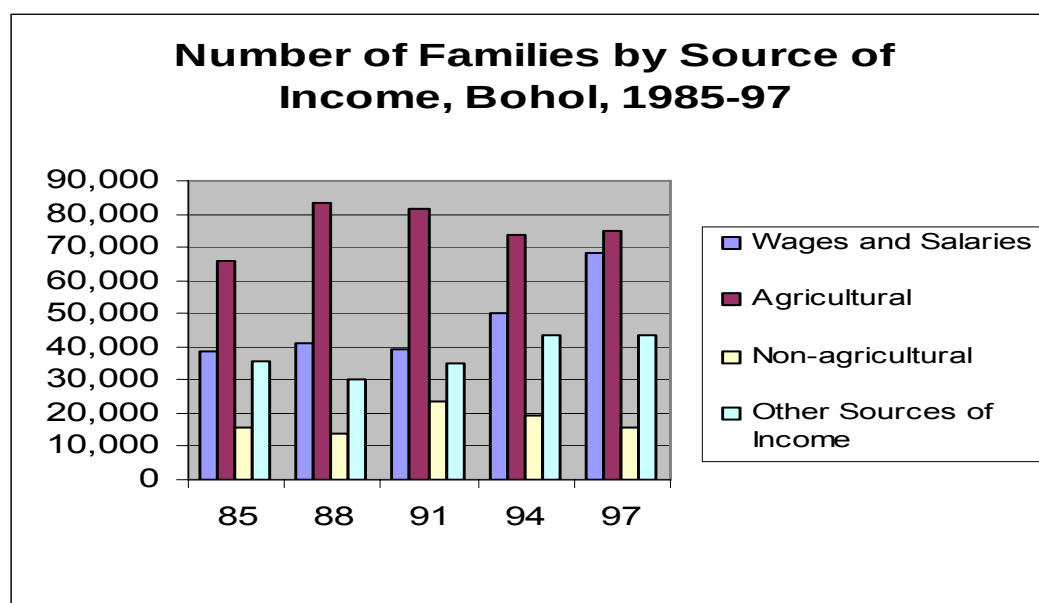
	1997	2000	% Change
Philippines	6,801	7,829	15.1

³ Food Threshold is defined as the minimum cost of food required to satisfy nutritional requirements for physical activities.

Region 7	5,771	6,760	17.1
Bohol	5,314	6,329	19.1

Source: NSO

Sources of Income. Agriculture as a source of income had been declining in Bohol from 50 percent of families to 37 percent from 1985 to 1997. Wages and salaries had shown a steady increase over the same period from 25 percent to 34 percent. This may also indicate a gradual shift from farming to nonfarming occupations yet non-agricultural and other sources had remained more or less steady. This corroborates the findings in a cluster of irrigated barangays discussed below, that sources other than farming had provided incomes to families in Bohol (Fig. 3 and App. Table 6).



Source: FIES, NSO

Fig. 3. Sources of Income of Bohol families from 1985-97.

Household Income and Expenditure in Irrigated Areas of Ubay⁴ It is useful to look at some data, albeit limited that would give us some picture of the households in the area. A survey of 23 households in the Capayas Irrigation Project (CIP) area consisting of four barangays indicated that the mean total

household income in 1997 was P28,894.00 pesos, which was only about half of the province's for the same period. This figure more than doubled during the year 2000 to P58,031.00. On-farm income accounted for more than 90 percent of the total for 1997. In the year 2000, on-farm income accounted for only about 50 percent. A dramatic increase was noticed in non-farm income, which rose by around 20 times. On-farm income increased by only about 15 percent during the same period. This gives us some indication that while income from farming increased, other sources even provided a greater share of the income of the CIP families. It might be said then, that other factors in the economy may have had a greater impact on the CIP households than agriculture.

The mean total household expenditure for 2000 was P36,335 and farm expenditure was P21,931 making a mean total family expenditure of P58,266.00 pesos which was slightly higher than the total household income of P58,031.00 pesos. The shortage was very little. Surprisingly, the 1997 calculation for household expenditure was much higher than the 2000 figure by about 25 percent. One explanation here is that there might have been errors in measurement since the data called for a longer time lapse for recall. Of the on-farm income in 2000, rice accounted for 70 percent and upland crops and livestock shared an almost equal percentage of 13 percent each.⁵ This brings the percentage of income from rice farming even lower than off-farm and non-farm sources.

Housing and Amenities. Data show that almost all households lived in a single house in both in Ubay and the whole province although the percentage for Ubay was higher than the province's. However, the proportion of houses with galvanized iron (GI) roofing was much lower in Ubay than in the whole province with nearly $\frac{3}{4}$ in the latter while only half (52.5%) in the former. The proportion of houses that needed no repairs was comparable for Ubay (50.9%) and the

⁴ Taken from E. Saz, Social Impact Assessment of the BIAPP Activities in the CIP Sub-site, Ubay, Bohol. 2001.

⁵ Breakdown by source are as follows: rice-70.11%, Vegetables-3.47%, Upland crops-13.14% and livestock-13.27%. See Income and Expenditure Survey for CIP households.

province although more in the latter (57.7%) needed no repair. House ownership rate was the same for the town and the province (Table 7).

Table 7. Selected housing characteristics, Ubay and Bohol province, 2000.

	Single house	% to total	With GI roof	% to total	Needs no repair	% to total	Owned	% to total
Bohol	205,547	96.4	154,169	72.3	123,042	57.7	173,884	81.5
Ubay	11,311	98.25	6,044	52.5	5,860	50.9	9,360	81.3

Total households: Bohol=213,215; Ubay=11,512 Source: NSO

Selected amenities found in households are shown in Table 8. The radio was the most common amenity relatively distributed in almost similar proportions in the town and province. A higher proportion of households of the whole province than Ubay had TV and telephones. The proportion of those who had motor vehicles was almost the same for Ubay and the province.

Table 8. Selected household amenities, Ubay and Bohol province, 2000.

	Radio	% to total	TV	% to total	Phone	% to total	Motor vehicle	% to total
Bohol	159,336	74.7	7,995	37.5	9,918	4.65	21,854	10.25
Ubay	8,820	76.6	3,016	26.2	136	1.22	1,064	9.24

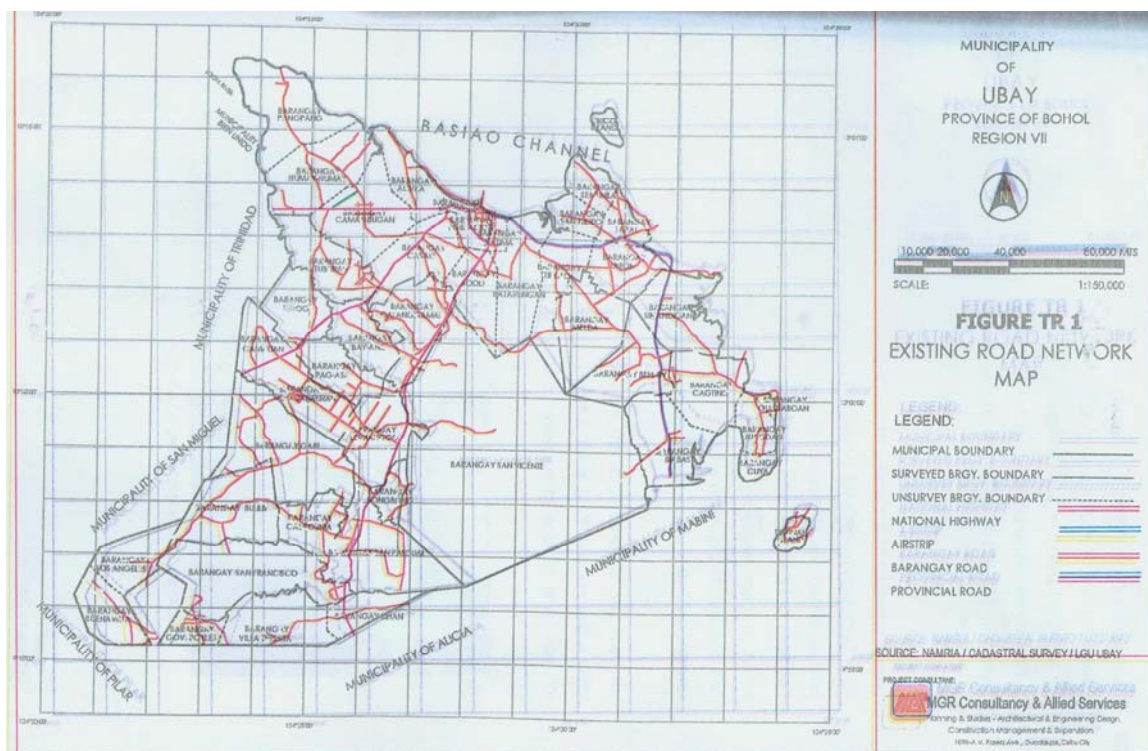
Total households: Bohol=213,215; Ubay=11,512 Source: NSO

Other Socioeconomic Indicators

Commerce and Trade. Ubay had a number of business establishments mostly small-scale commercial trading firms engaged in retail and wholesale. A new public market building was completed recently. The regular market day was Monday and local traders from neighboring towns came to sell their merchandise consisting mostly of agricultural products and small consumer items like used clothes, household utensils and other products. Ubay also provided a market for the neighboring island municipality of Carlos P. Garcia. Local trade with Leyte

and Cebu were facilitated by regular daily or twice-daily boat trips to and from Maasin City Southern Leyte, and Bato, Leyte and Cebu City. Passenger and cargo traffic to these destinations had also noticeably increased over the years indicating an also increasing volume of trade between these points.

Transportation and Communication. The improvement of the Bohol circumferential road and the port facilities had helped Ubay to become the trading and transportation hub of northeastern Bohol connecting it to the neighboring island of Leyte and the rest of Bohol province. Land transportation was adequate with various short and long-distance buses, jeeps and vans connected Ubay to the rest of the towns in the province. Tagbilaran City could be reached from Ubay in two to three hours by bus or van. Bato, Leyte and Maasin City, Southern Leyte could be reached in 2-3 hours by boat. Cebu City was 6-8 hours away by boat. Water transportation was also available for neighboring island and coastal communities. An airport had been established in town but was not yet operational. Various communication companies (4 phone companies) provided the public with access to local and international communication services. Messengerial, courier and postal services were also available in town. Internal transportation was relatively good because of the presence of good dirt roads crisscrossing the municipal landscape. The most common form of transportation was the tricycle for nearer barangays. For far barangays, the most common mode of transport was the motorcycle. Normally, motorcycle fare was very much higher than other forms but this was the only way to reach these barangays faster. All barangays were connected by roads and the only places where there were no roads were the steep slopes in the central mountains (Fig. 4).



Source: Ubay CLUP

Fig. 4. Road network, Ubay

Energy and Water. Bohol was linked to the major source of geothermal power in Leyte through the underwater connection between Maasin, Southern Leyte and Ubay. Presently, only three of the 44 barangays had no electricity, yet only 34.97 percent of the total households in the municipality had electricity compared to the province, which was 58.3 percent energized in 2000 .

The town proper and seven other barangays was served by the Ubay Water and Sanitation Cooperative. The cooperative planned to expand their service to eight other barangays in the near future. Due to consumer demand and the limited size of the supply, water service became difficult during dry months. Bohol province reported that 23.71 percent of its households had their own faucets from a community system while Ubay reported only 8.97 percent. For the province, 21.68 percent of households had access to shared faucets while Ubay only had 8.86 percent. In Ubay, slightly more than half (51.83%) of the households had access to dug wells.

Education, Mass Media, Health and Recreation. Ubay had a college offering two and four-year courses, six public and private high schools and at least one public elementary school in each barangay. Local newspapers were available daily in the poblacion. A local radio AM station, DYZD, was also based in town. Various other radio and TV stations were accessible. The town had one cockpit and numerous basketball and tennis courts for recreational purposes. Several lodging houses provided accommodations for visitors from out of town. For health services, the town had two public health units staffed by doctors, nurses, midwives, dentists, medical technologists and sanitary inspectors. A small government hospital was established to provide outpatient services to local residents. A private 15-bed hospital also provided services for emergencies. A pediatric and OB-Gyne clinic complimented the health services available in town. Barangay Health Workers (BHW) from each barangay provided direct health care assistance to barangay residents.

Public Order and Safety. The local police force was composed of 37 policemen. Police-population ratio was computed at 1:1,616, lower than the standard ratio of 1:1,000. The police was augmented by 492 Barangay Tanod volunteers. It was reported that crime rate in Ubay was relatively low. The local Fire Department was staffed by eight fire fighters with two fire trucks. Incidence of fires was reportedly low in the municipality.

Physical and Agronomic Conditions

The data presented below show that in terms of the biophysical conditions of Ubay, crops of various types could be successfully grown. The general topography was rolling plain and roughly 90 percent of the area had slopes that were suitable for agriculture (below 18 percent) and therefore, amenable to all types of cultivation. The soil conditions, generally sandy loam, were also suitable for various crops except in certain areas, which were generally sandy and high in salinity, namely those closer to the coast. Nevertheless, these were a small

percentage of the total agricultural area. Flooding, drainage, and erosion were not significant problems.⁶

Land Area. Ubay has a total area of 29,945.78 hectares. Other sources report different figures such as 33,506.38 hectares according to the municipal assessor's office; 27,200 according to the NCSO citing the Land Management Bureau and completed cadastral survey as sources; and 24,409 hectares according to the Provincial Environment and Natural Resources (PENRO).

The land area of the Municipality of Ubay is 7.27 percent of the total land area of Bohol, the biggest in the province's municipalities; 2 percent of the total land area in Region VII; and 0.10 percent of the Philippines' land area. Land areas by barangay are found in Appendix Table 7.

Topography and Slope. Ubay's topography was predominantly moderately rolling with occasional highly rugged and mountainous areas. The highest elevation was 428 meters above MLLW level and the lowest elevation was 5 meters MLLW level. Dominant slope was 0-3 percent found in the northern, eastern and western portion occupying 38.79% of the total land area. Slopes of 18-25 percent and 25-30 percent (very strongly to steeply sloping) were prevalent in the central portion. Slopes of 30-50 percent and above can be found in the southern portion (Figs. 5 & 6).

Soil Classification. Ubay has six known types of soil. The most dominant, Ubay sandy loam (17,041.39 hectares or 59.90%) and Ubay clay (10,884.86 hectares or 36.34%) cover almost the entire area. Other soil types are listed in Table 9. The locations of each soil type are illustrated in Fig. 7.

⁶ See CLUP. 66.5% had no flooding hazard and 60.49% was not susceptible to erosion.

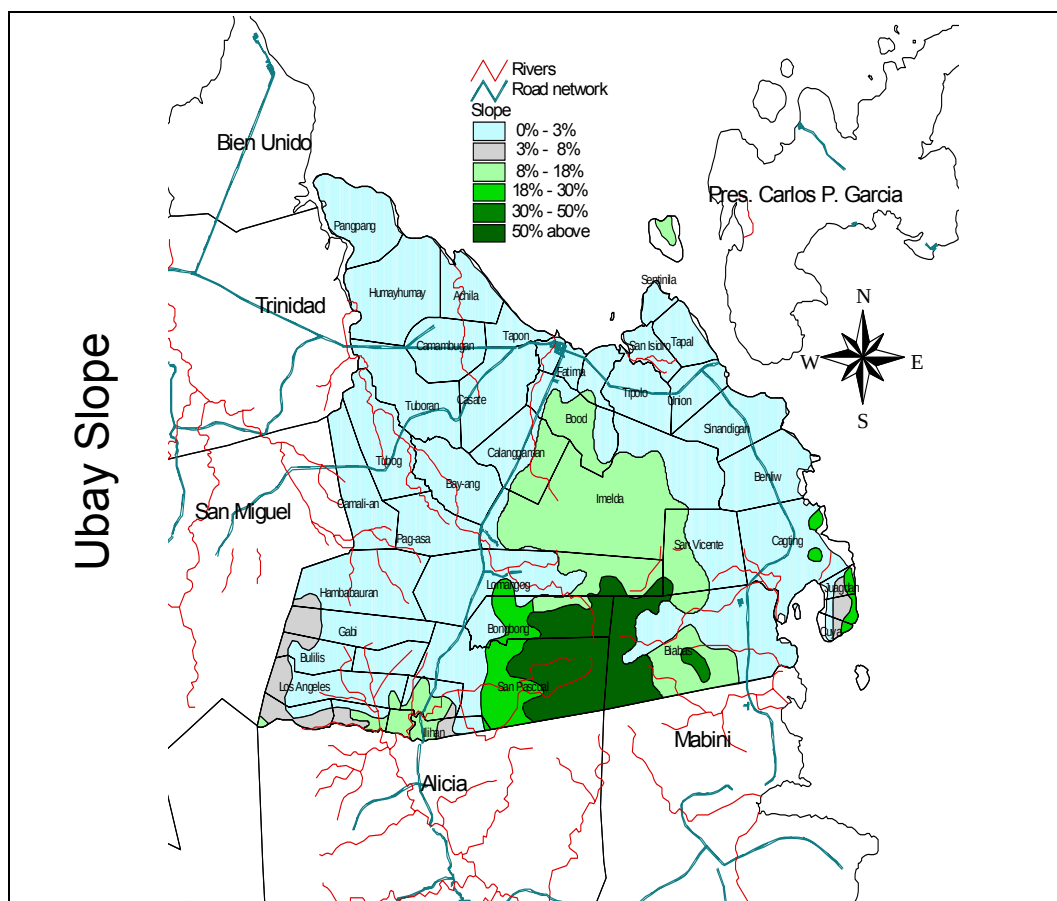


Fig. 5. Topographic map of Ubay

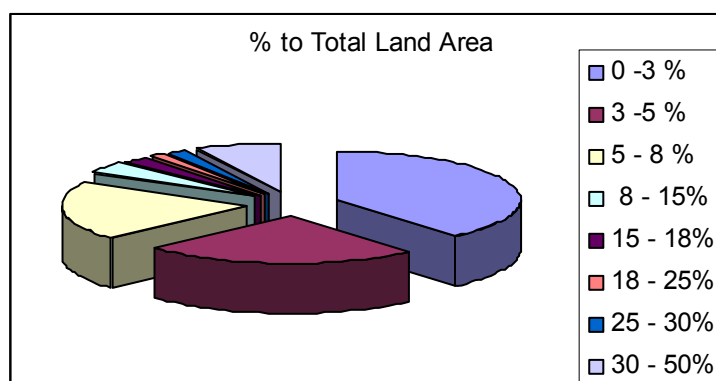


Fig. 6. Slope distribution of Ubay

Table 9. Soil classification, 2002

Soil Type	Area	% to Total
1. Ubay Sandy Loam	17,041.39	56.90
2. Ubay Clay	10,884.86	36.34
3. Faraon Clay	886.53	2.96
4. Rough Stone Land	470.22	1.57
5. Hydrosol	494.18	1.65
6. Beach Sand	173.71	0.58
Total	29,950.88	100.00

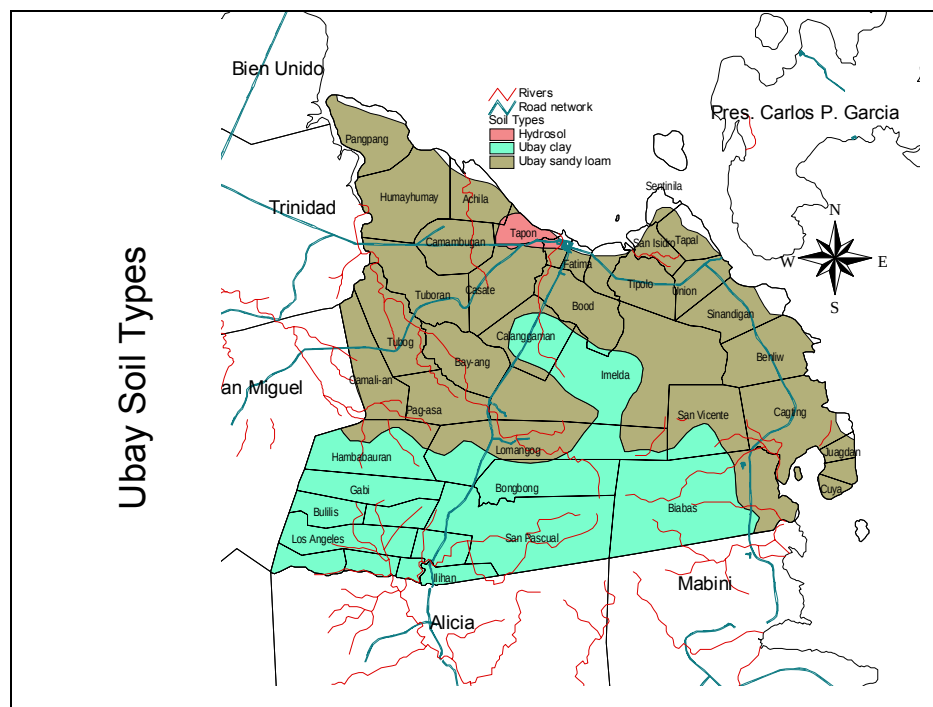


Fig 7. Soil map of Ubay

Land Capability Classification. In general, most of Ubay had Class A land. This type of land was characterized as having “slight soil limitations and loamy profile. It can be cultivated safely requiring only simple but good farm management practices. It has level to nearly level slope, with no to slight soil erosion and no to slight flooding hazard and well drained”⁷. It is located along coastal plains of Barangays Pangpang, Humay-humay, Tuburan, Camambugan,

⁷ See CLUP.

Achila, Tapon, Poblacion, Fatima, Tubog, Sentinila, Chico, Benliw, Cagting, Guintaboan, Juagdan, Cuya, and Tintinan and dominant in coastal barangays of Benliw, Sinandigan, Casate, Bay-ang, Pag-asa, and Camalian. Also present in some areas in Barangays Union, Tipolo, Calanggaman, Bood, Katarungan, Imelda, Benliw, Biabas, and San Vicente. Most of these areas were suitable to both rice and corn cultivation (App. Table 8).

Weather and Climatic Conditions

Rainfall and Typhoons. The average rainfall distribution throughout the year recorded from the PAGASA station in Mactan, Cebu, for the years 1997-2001 is shown in the table below. Table 10 shows that more rain occurred from the months between June and December with November and December as the wettest and a drier spell in August. Bohol was generally bypassed by strong typhoons as it is out of the typhoon path but occasionally Ubay was hit by typhoons. The latest recorded were Nitang (August-September 1984) and Ruping (November 1990).

Table 10. Annual average rainfall, 1997-2001.

Month	Average Rainfall (mm)	Average Number of Rainy Days
January	109.2	12.0
February	115.1	11.0
March	66.9	9.0
April	71.2	8.0
May	129.5	12.0
June	163.2	16.0
July	188.3	16.0
August	126.1	15.0
September	187.5	13.0
October	184.1	18.0
November	204.2	16.0
December	192.6	16.0

Source: CLUP citing PAGASA data.

CHAPTER 3

THE STRUCTURE OF AGRICULTURE

Bohol island is generally of karst formation. Most of the coastal areas were not suitable for agricultural production but the interior and noartheastern portions provided ideal areas for intensive agriculture because of the presence of suitable soils and water. Extensive areas planted to rice can be seen along the central plains stretching towards the northeastern coast. The higher elevations were generally covered with secondary forests or permanent crops such as coconuts but these were not very extensive. Corn and rootcrops were generally planted in areas where there was no irrigation.

It was claimed that despite the limitations to the agronomic condition of the island, it produced 66.5 percent of the rice in the region and 74 percent of the rootcrops, 44 percent of the livestock and 54 percent of the fish.⁸ Despite these, however, poverty incidence in the island, owing probably to the limitations of the land was high. Unemployment was reported to fluctuate between 5.4 to 8.6 percent from 2000 to 2003⁹. It may be inferred that since the province is generally rural, most of the poverty, therefore exists in the rural, hence, agricultural areas.

The Agriculture Population

Rural and Farm Population of Bohol. The rural population of Bohol had been consistently high, 4 in every 5, over the years from 1960 to 2000 although the number had been consistently decreasing. The actual farm population as recorded in the agriculture censuses of 1970 and 1980 were much lower than the rural population. This means that many who lived in rural areas did not live in farms or were not engaged in farming. In general one can conclude that Bohol was and still is a predominantly rural and agricultural province (Table 11.)

⁸Bohol Sunday Post quoting unnamed sources.

⁹ The figures for 2000 was 7%, 2001, 5.4%, 2002, 8.6% and 2003, 7.4. (FIES)

Table 11. Total, rural and farm populations of Bohol, 1971-2000.

Year	Total pop	Rural Pop	% to Total	Farm Pop	% to Total
1960	592,194				
1970	683,297	586,643	85.86	386,383	56.54
1980	806,013	683,099	84.75	547,210	67.89
1990	947,098	707,481	74.7		
2000	1,139,130				

Source: NCSO

Characteristics of Rice Farming Households in Four Irrigated Barangays. In the Capayas Irrigation System (CIP) area comprising of four barangays, the average household head was 47 years old and the average household was around six members. They were divided almost equally by tenure between owners and tenants despite the fact that this area was already subjected to land reform. Nearly 60 percent of the household heads finished or attended only primary school. More than two thirds had attended seminars on crop production and related topics such as cooperatives and irrigation management between 1991 and 1996. The average household had an annual income of P61,023.00 pesos with slightly over half of it earned from nonfarm sources. Therefore, these farmers did not have farming as their main source of income. Nearly two-thirds (62%) cultivated an area of one hectare or less; more than half cultivated an area of only half a hectare or less. With very few cultivating ten hectares or more, the average landholding was .94 ha. per household.

Number of Agricultural Workers. An estimate of the number of farmers, fisherfolks and related workers in the area show that they were present in all barangays comprising of 12,223 farmers and 1,654 fishermen. The figures for 1997 show some interesting difference from the 2002 data. The number of farmers increased from 10,050 to 12,223 while the number of fishermen decreased from 2,225 to 1,654. This means that fisheries could have declined resulting also to the shift in occupation by some fishermen. The data also shows

that if each farmer represented at least a family, then nearly all the households were farming households (Table 18).

Farmers and Fisherfolk Organizations. There were quite a number of farmers' and fisherfolk associations present in Ubay. The strengths of these associations, however, need to be seen in terms of concrete programs and projects that helped members in their occupations. It can be surmised, that most of these organizations were weak. Even the Irrigators' Associations, which were supposed to help maintain their facilities and collect fees, were unfortunately problematic. Another case in point was the rebel returnees group, which was based supposedly in Tuburan. A 50-hectare lot was allocated to them by the government under the National Reconciliation and Development Program (NRDP). It is pathetic to see the resettlement area abandoned and the beneficiaries scattered in various places around Bohol. The organization had experienced serious problems and a new set of officers was elected despite the objections of the existing leader. A litany of the problems of the association as put forth by the new leadership more or summarized all the problems of the rest of farmers and fisherfolk associations in the locality. The numbers did not include those organized by other agencies and NGOs (Table 19).

Table 12. Number of agricultural workers, 2000.

Occupation	Location	Total
Farmers		
Crop Farmers	44 Barangays	11,632
Livestock Farmers	44 Barangays	125
Poultry Farmers	44 Barangays	1,340
Fishermen		
Municipal Fishermen	20 Coastal Barangays	625
Aqua Farm Cultivators	19 Coastal Barangays	102
Other Farm workers	44 Barangays	525
Total		14,349

Source: MAO, Ubay

Table 13. An indicative number of associations and members, 2002.

Organization	Number of Organizations	Number of Members
Farmers' Association	18	707
Rural Improvement Club (RIC)	10	278
Fishermen's Association	19	969

The Farms

Total Farm Area, Average Farm Area and Number of Farms. In the Philippines, the number of farms rose from 4.6 million in 1991 to 4.8 million in 2002 but the farm area decreased from 9.97 million hectares in 1991 to 9.67 million in 2002. The average farm area subsequently decreased from 2.16 in 1991 to 2.01 in 2002. In Bohol it can also be seen that the area farmed rose gradually through the years as well as the number of farms yet the average farm size had decreased. Between 1948 and 1991 the average farm size had been more than halved from 2.51 to 1.25 hectares This figure was only more or less one half of the national average in 1991 and 2002 which were 2.2 and 2.02 hectares, respectively. This means that the average Boholano farmer cultivated only one half the farms size of the average Filipino farmer. On the average, the Ubay farmer had a slightly bigger farm (2.02 and 1.83 ha) than the Boholano farmer (1.58 and 1.25) for the 1981 and 1991 periods (Table 12).

Table 14. Total farm area and no of farms, Bohol and Ubay, 1903-1991.

Year	Total Land Farmed		No. of Farms		Ave. Area (ha)	
	Bohol	Ubay	Bohol	Ubay	Bohol	Ubay
1903	58,098		36,869		1.58	
1918*	131,874		88,293		1.49	
1939**	175,747.62		63,388		1.49	
1948**	163,030.50		65,013		2.51	
1971	142,070.3		61,107		2.32	
1981	159,270	9,514	100,462	4,706	1.58	2.02
1991	166,826	12,322	133,841	6,732	1.25	1.83

*Farms had at least an area of 200 sqm; **Farms had at least an area of 1,000 sqm.

Source: Census of Agriculture

Farm Size and Tenure in Ubay. Land ownership in Ubay was generally distributed among its farming population. In the 2000 census, 2,819 (28%) of the 10,050 households, reported to have owned agricultural land. Among these landowners, 668 (6.65% of total household population and 23.7% of total land owners) reported to have owned land through agrarian reform. There were exceptionally large land holdings but most of the rice farms were small and those large enough were subjected to land reform. An estimate of the average land holding for the whole municipality was pegged at .75 hectare. The average landholding in the irrigated cluster of four barangays of Casate, Kalanggaman, Tuburan and Bood was .9 hectare with a high incidence of tenancy. Records from the Department of Agrarian Reform however showed that a big number of tenants had benefited in terms of tenure improvement through the land transfer and leasehold schemes.

Number of Farms by Tenure. It can also been seen that while the number of farms in Bohol under full ownership, part ownership and tenancy generally increased from 1971 to 1981, their number had decreased from 1981 to 1991 (Table 13). This phenomenon is, however, difficult to explain.

Table 15. Number of farms by tenure, Bohol 1948-1991.

Year	All	Full Owner	Part Owner	Share Tenant
1948*	65,013**	45,166	9,104	7,788
1971	61,107	35,741	16,026	18,192
1981	100,462	69,668	27,984	34,260
1991	133,841	42,781	22,386	14,346

*Farms were limited to at least 1,000 sqm.;

**Includes other categories of tenants totalling 3,654.

Source: Census of Agriculture

Comparison of Farm Tenure among Philippines, Bohol and Ubay. A comparison of the farm tenure situation of Bohol to the national shows that the fully owned farms were more or less similar in percentage but the fully tenanted farms while generally lower for Bohol from 1960 to 1981 but increased in 1991 contrary to the much lower percentage nationally. Some farmers had already

shifted to fix rent by 1981 indicating that they had benefited from the agrarian reform program by this time. The area under full ownership increased despite a decline in the number of farms under full ownership. The area under tenancy also increased with the slight increase in the number of farms under tenancy (Tables 14 & 15). These phenomena could mean increasing land consolidation and increasing tenancy despite agrarian reform.

Table 16. Percent of farms under full ownership and full tenancy, Phil. and Bohol, 1960-1991.

Year	Fully owned		Fully tenanted	
	Phil.	Bohol	Phil.	Bohol
1960	53.2	53.2	37.1	18.9
1971	62.9	57.7	26.5	13.4
1981	66.8	65.5	25.5	10.6
1991	48.7	45.5	5.3	11.9

Source: Census of Agriculture

Table 17 . Farm area by tenure, Bohol, 1971-1980

Year	All	Full owner	Part owner	Share tenant	Fixed rent	Free rent	Others
1971	142,070.3	82,033.1	33,702.3	18,221.7			1,162.6
1981	159,270	96,125	29,610	28,731	2,664	1,902	238

Source: Census of Agriculture

In Ubay, the number of farms in all size categories increased from 1981 to 1991 but the largest increase was seen among farms of less than half a hectare, tripling from nearly 6 percent in 1981 to 17 percent in 1991. The biggest percentage of farms was those between 1-1.99 ha at 31.49 percent in 1991. And relatively fewer farms were larger than 7 ha. Yet a good percentage was less than half a hectare. (Table 16). It can be noticed also that the largest area was under full ownership but in 1991 the area under share tenancy increased. Furthermore, agrarian reform had transformed some farmers into owners and fixed renters by 1980 and 1991. The data suggests that the sharp rise in small farms may be due to fragmentation as larger farms were parceled into smaller

farms due to sale or subdivision among heirs or beneficiaries. Yet, the increase in the number of large farms may also show a trend in land consolidation as mentioned above. A confounding revelation is the rise in the number and size of farms under full ownership and share tenancy at the same time. One is further confounded by the decline in the number and area under fixed rent (Table 17).

Table 18. Number of farms by size, Ubay, 1980-1991.

Year		All	Less .5	.5-.99	1- 1.99	2- 2.99	3- 4.99	5- 6.99	7- 9.99	10- 24.99	25+
1980	No	4,706	275	1,077	1,546	797	702	194	22	88	5
	%		5.84	22.88	32.85	16.93	14.92	4.12	.46	1.87	.01
1991	No	6,732	1,134	1,293	2,120	908	890	247	71	60	9
	%		16.84	19.21	31.49	13.49	13.22	3.67	.10	.89	.01

Source: Census of Agriculture

Table 19. Number and area of farms by tenure, Ubay, 1980-1991.

Year		All	Full owner	Heir	OLT	Others	Share tenant	Fixed rent	Free rent
1980	no	4,706	2,432	939	221	34	1,534	94	163
	area	9,514	4,952	2,174	405	410	2,154	183	221
1991	no	6,732	1,728	843		51	1,561	40	395
	area	12,322	3,154	1,350		76	3,059	56	328

Source: Census of Agriculture

Production and Productivity

Crop Production. Ubay had an agriculture based economy on which approximately 75 percent of the total population depended for a living. The municipality had 20 coastal barangay including island barangays and 24 upland barangays suited for crop production. In the past decade, Ubay farmers planted only one crop but lately many farmers adopted the diversified farming practices replacing the purely single cropping system.

The various crops include the following: rice (irrigated, non-irrigated), corn, coconut, mango, banana, cassava, vegetables, ornamental crops, legumes, pineapple. African oil palm had just been introduced to the area within the last few years. As per record from the MAO, the municipality had a total of 12,961.10 hectares of agricultural land utilized for crop production accounting for 43.28 percent of the total land area (Table 20).

Table 20. Area devoted to crop production, 2000.

Crop	Area (Has.)	% to total Agricultural Land	% to total Mun. Land Area
Rice	6,249.00	48.21%	20.86%
Irrigated	1,160.00	8.95%	3.87%
Non-Irrigated	5,089.00	39.26%	16.99%
Corn	500.00	3.86%	1.67%
Vegetables	26.10	0.20%	0.001
Rootcrops	1,403.00	10.82%	4.68%
Industrial Crops	1,984.00	15.31%	6.62%
Mango	504.00	3.89%	1.68%
Coconut	1,480.00	11.42%	4.94%
Legumes	240.00	1.85%	0.80%
Other Crops	2,559.00	19.74%	8.54%
Total	12,961.10	100.00%	43.27%

Source: MAO

The Rice Subsector

Production and Productivity. Rice production yield is computed based on two croppings per year with an average yield of 4.00 metric tons per hectare for irrigated and 2.5 metric tons per hectare for non-irrigated areas. The total annual yield for irrigated rice was 9,280 metric tons for non-irrigated areas with a combined annual yield of 34,725 metric tons. The irrigated area had a total production value of P37.12 million pesos and P101.78 million pesos with a combined total of P138.90 million pesos. Lately, hybrid rice was introduced to the area and yields of as high as 9 - 12 tons were reported by a few farmers.

Technology adoption and flow. Rice technology in Ubay dates back to the early days of rice cultivation. Certain areas of the locality had been able to plant two seasons per year despite the absence of irrigation because of the availability of water during most of the year. With the nature of the rolling topography, areas at the base of the gently rolling slopes stored water longer. These were locally called “lansub” areas while those areas above were called “sinaka”. The lansub areas were planted to two seasons of rice while the “sinaka”

were only planted during the wet season, which began in June. Most of the rice areas in Ubay were rainfed and were only planted once a year.

The major source of rice production technology was the Department of Agriculture through its various package programs usually involving new seeds, fertilizers, chemicals, and incentives for farmers. Many farmers, however, had only experienced direct contact with extension workers lately owing to the fact that most government rice production programs were targeted only for irrigated areas. At present, most farmers had already been exposed to the new technologies in rice production but the level of adoption of these technologies was difficult to assess. If indications are correct, the latest season (DS2005) involving the planting of hybrid rice, only 16 farmers participated. This is not to say that most farmers did not adopt high-yielding varieties (HYVs) and other technologies. This can only mean that farmers did not adhere completely to the set of recommendations for various reasons, most important of which, was cost. In fact, local extension agents believed that farmers only adopted government production programs because of the incentives provided. Otherwise, they partially adopted technology packages based on their capacity to pay for these technologies, their level of understanding of the technologies and their potential effects on yield. So that today, the sources of technology were many and most of these technologies were no longer new to most farmers. If one makes a cursory examination of the varieties planted by farmers, he would discover many, indicating that the farmers had obtained this technology from many sources also. For seeds, farmers bought from an organized group of seed growers province-wide, the Bohol Farmers Marketing Cooperative (BOFAMCO) several members of whom were from Ubay. Not many farmers in the locality, however, relied on the BOFAMCO and the seed growers themselves were experiencing problems of payment from the government. Either farmers sourced their seeds from their neighbors or they got their seeds from their previous crop. Except for hybrid rice, which cannot be sourced from the previous crop, a farmer availed of seeds from many sources. As far as fertilizer and chemical technologies were concerned, the farmers learned from the extension staff and also asked the merchants who sold

these inputs. Much to the disappointment of the extension staff, farmers who had been trained on Integrated Pest Management (IPM) still used chemicals extensively.

A summary of the flow of technology for rice is shown in Figure 8. This figure shows that rice technology mainly flowed from government sources, specifically the Dept. of Agriculture. The DA through its arm in Bohol, the Agricultural Promotion Center (APC) based in Tagbilaran City usually promoted new varieties along with their technology packages. Each new variety introduced was coursed through the Provincial Agriculture Office (OPA) and to the municipal offices. The DA had a local arm in Ubay, the Bohol Experiment Station (BES) that produced certified seeds for local consumption. Seed growers also provided technical information to buyers. Input dealers did the same. The Municipal Agriculture Office was the main contact of the farmers for technology. Farmers generally sought information from other farmers. In the case of alternative technologies such as low-input and organic agriculture technology, a Non-government organization, the Southeast Asian Regional Initiatives on Community Empowerment (SEARICE) was recent source in cooperation with the Provincial Agriculture Office and the Central Visayas State College of Agriculture, Forestry and Technology (CVSCAFT).

Under the BIAPP, rice production technology was provided mainly by the BIAPP staff who were DA staff. In addition, Japanese scientists provided backstopping to the DA staff. Local staff were detailed to the program but only two were closely involved. The program lasted until 2001. Under the program, rice technology was combined with a search for a number of rice-based cropping systems in recognition of the limitations of the irrigation system and the peculiarities of the soils in the area. While there were promising leads such as the introduction of watermelons and vegetables, these were not sustained after the program expired. The present program of the local staff included non-rice crops but these were targeted for traditionally non-rice growing areas.

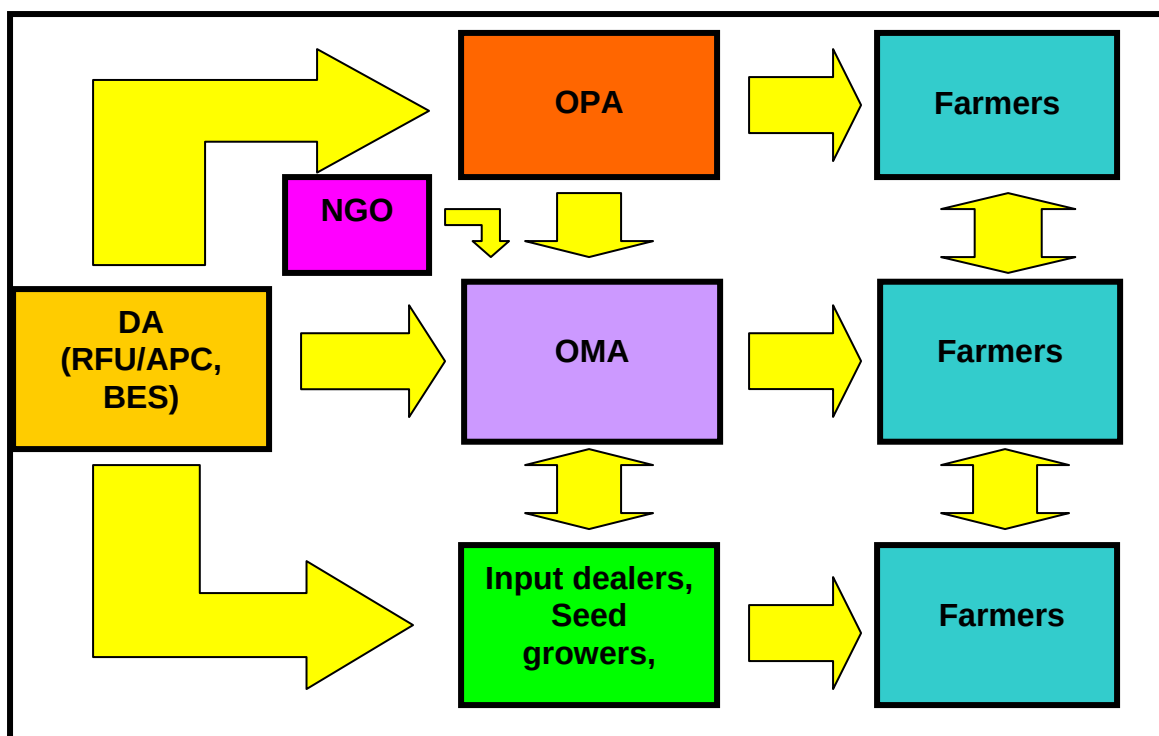


Fig. 8. Technology flow for rice

Marketing. Rice trade in the province as well as in Ubay was dominated by one major trading firm—Altura’s Group of Companies. There were a few local buyers but they were only agents of Altura’s. The company bought from all over Bohol and marketed clean rice all over the province as well as Cebu. It owned several supermarkets in Tagbilaran City and in Talibon. It also supplied to local retailers.¹⁰ The NFA had put up a warehouse in Ubay but farmers still preferred not to sell to it because they said it had many requirements and they could not be paid immediately. It should also be pointed out that for many farmers, there was not much to sell to outsiders because their production was barely enough for their own consumption and to pay their debts. Most farmers obtained production and other loans from nonformal sources, which charged high interest.

¹⁰ The company is into production of feeds, contract growing of corn for its feedmill, poultry, piggery, fishpond, copra trading, supermarkets and department stores. It owns several supermarkets in Tagbilaran city and in other towns. It also supplies the many retail stores throughout the province.

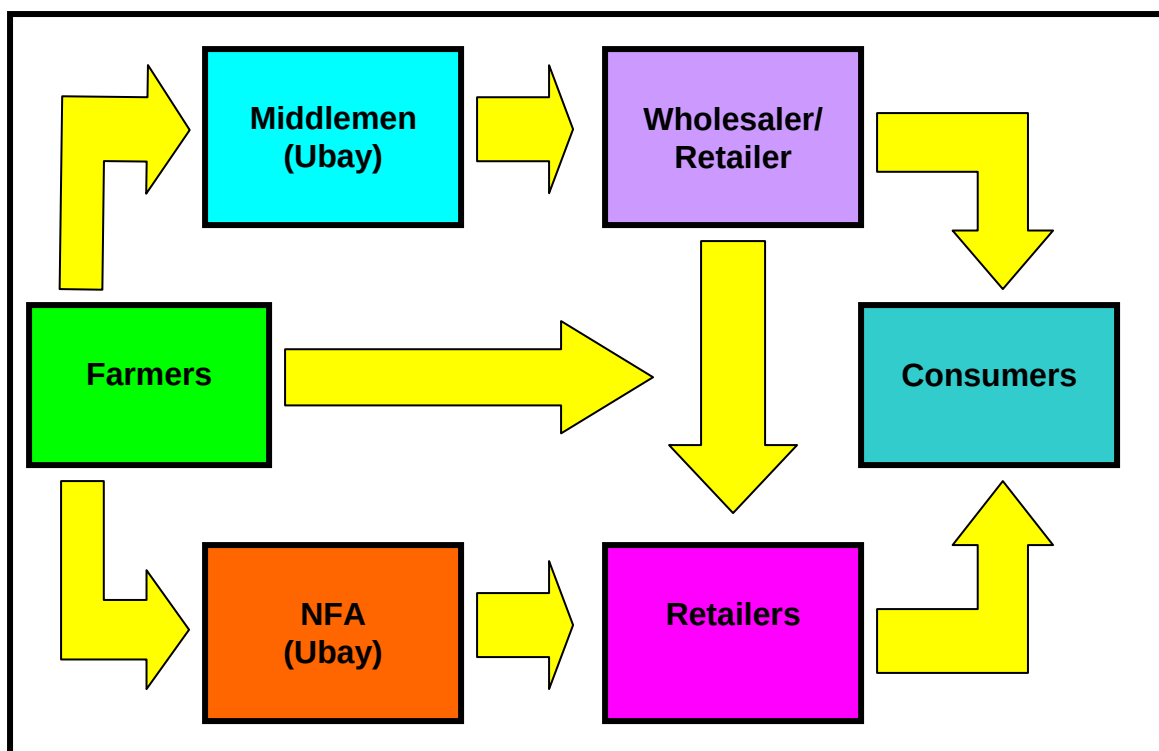


Fig. 9. Marketing flow for rice in Ubay

Productivity and Profitability Impacts. Benchmark data in the area revealed that the average yield was 2.8 mt/ha (70 bags at 40kg/bag). The monitoring data revealed a consistent rise in average yields reaching to 4.6 mt/ha, (115 bags) higher than the targeted 4.0 mt/ha (100 bags) by 2001.¹¹ The data suggest that average yields could go higher than 4 mt/ha as shown by some farmers who had already achieved much higher yields as early as 1996. At that time, some farmers serviced by the main canal already obtained yields of 5 to 7 mt/ha (125-175 bags) using the recommended varieties Ala, Pagsanjan, and the traditional variety Red 15.¹² On the other hand, it was also found that some farmers still got yields of as low as .8 mt or 20 bags per hectare.

In terms of profits, little data can be gleaned. A look at the production expense, however, will give us an idea of whether profits were realized or not. In

¹¹ For comparison, the average for Bohol province in 1994 was 4.5 mt/ha in irrigated areas. Including rainfed areas, the average was 3.94 mt/ha. Ubay had an average of 3.45. See 1990-94 Technical Reports.

1996, production costs ranged from P13,139.04 pesos for owner operators to P19,443.04 pesos for tenants per hectare. The difference was accounted for by the landowner's share incurred by tenants. It is clear then, that tenure was a very significant factor to profitability as land rent expense accounted for roughly one third of the total farm expenses. In the 2000 Income and Expenditure Survey, (23 families) it was found that the mean on-farm income was P29,942 and mean farm expense was P21,931.5. The mean net farm income was P8,010.50 or 36.52 percent of their investments. This might be considered impressive but if the average income per month from farming was computed, it was only a measly P2,002.62 a month for a family of seven.¹³ This income definitely could not provide even the minimum basic food, clothing, shelter, education and health needs of an even smaller family.

Factors Perceived to Affect Yields and Profits. The major factor to yield increase was irrigation. It was claimed that before irrigation was made available, the farmers could still plant twice a year but the water was not predictable they could not plan their tasks well. With irrigation, they could plant on schedule thus, not wasting their seedlings and could apply inputs correctly at the right time.

Farmers also revealed that high yielding varieties were one of the most important factors in yield increase. They could cite specific varieties that performed well. For example, all informants cited Ala or RC 18 as one with the best record in terms of yield and eating quality. The farmers were planting other varieties including the hybrids and other NSIC varieties

Another factor cited were other technologies including fertilizers. However, unlike seeds of new varieties which had become easier to access because of the subsidies, fertilizers were not easily accessed because of their high cost. Farmers claimed that with little or no capital, they could not meet the recommended rates and at times could not secure fertilizers on time.

¹² Benchmark Survey Report. p. 26. This may be further examined because these are really very high numbers.

Another major factor was control of pests and diseases. The damage caused by rats, stem borers and diseases was considerable ranging from 30 to 100 percent. Asked as to why they were not able to stop the damage on time, farmers had a variety of explanations such as the occurrence has been widespread it was difficult to control, the method of control was ineffective, they did not know what to do, etc. In some cases, the extension staff were not aware of the susceptibility of new varieties to certain diseases that they failed to warn the farmers. In one case, a farmer had two successive crop failures using NSIC 211 because of disease. Another farmer claimed that he had yet to taste success with the hybrid seeds also because of disease.

As to profitability, farmers readily cited the price of rice and inputs as major factors. They claimed that prices of fertilizers and chemicals and rates of labor kept rising but the price of rice remained low. Even the NFA price of P11 per kilo could not be taken advantage of by the farmers because of other problems related to the NFA buying system that prevented the farmers from selling to the NFA. Most farmers who sold part of their crop brought them to local buyers other than the NFA. And if the buyer advanced money to the seller, additional price discounts further lowered the net proceeds.

The Mango Subsector

Scope of the Mango Industry in Ubay. Like the national situation, mango production in Ubay was generally small hold except for a very few large plantations. Almost all barangays in the municipality had occasional mango trees or clusters of mango trees planted. There were relatively large plantations like the Lucky Agriventures farms, which reported 7,000 trees. Several farmers had a few hundred trees. The total estimated number of growers was 410¹⁴ (App. Table 9). In general, mango production in Ubay was measured in number of

¹³ Income and Expenditure Survey.

¹⁴ The records of the MAO were based on those who signified membership in the Mango Growers' Association. It was reported that several growers did not bother to join because they

trees planted rather than area planted. Per record of the MAO, there were reportedly 18,200 bearing and 7,000 non-bearing trees. As of year 2002, the total land area planted to mango was 504 hectares with an estimated average yield per tree of .50 - 1.2 metric tons¹⁵. Based on the survey taken by the Bureau of Agricultural Statistics in 2002, the biggest mango-growing municipality in Bohol was Ubay and the biggest barangay growing mango in Ubay was San Pascual¹⁶ (See Figures 10 & 11). The total estimated production of mango in Ubay for 2000 was 1,260 mt with an estimated value of P25,200,000.00 pesos.

Production System. Mango seemed unique in its production system because many planters relied on contractors for production. Contractors, in turn, if they were not financially independent relied on financiers who were either bulk buyers or plain financiers to defray the costs for labor and chemicals. These financiers got a certain percentage of the gross. Some contractors were also buyers. In the end, the planters were reduced to receiving only a smaller percentage, usually 25-33 percent of the net income leaving most of the income to the contractors and financiers.

Production was generally expensive and it involved several groups of workers. A contractor would have a few or many people working with him depending on the size of his operation. Most of the work of his group involved spraying. From flower inducement to pest control and fertilizer application, a season could necessitate from eight to twelve sprayings. In addition, the bagging and harvesting would be done by a separate set of workers. As the fruits were approaching harvest, a planter or contractor may hire guards to protect the trees from thieves. As the fruits were harvested, laborers would also be hired to

could not see any advantage from joining. Therefore, the total reported was less than the actual number of growers.

¹⁵The records for mango could not be reconciled depending on the source. Given the problems of the industry, it is probably the lower estimate that is more accurate.

¹⁶Records from the local agriculture office showed that the biggest number of trees were planted in Barangay Gabi.

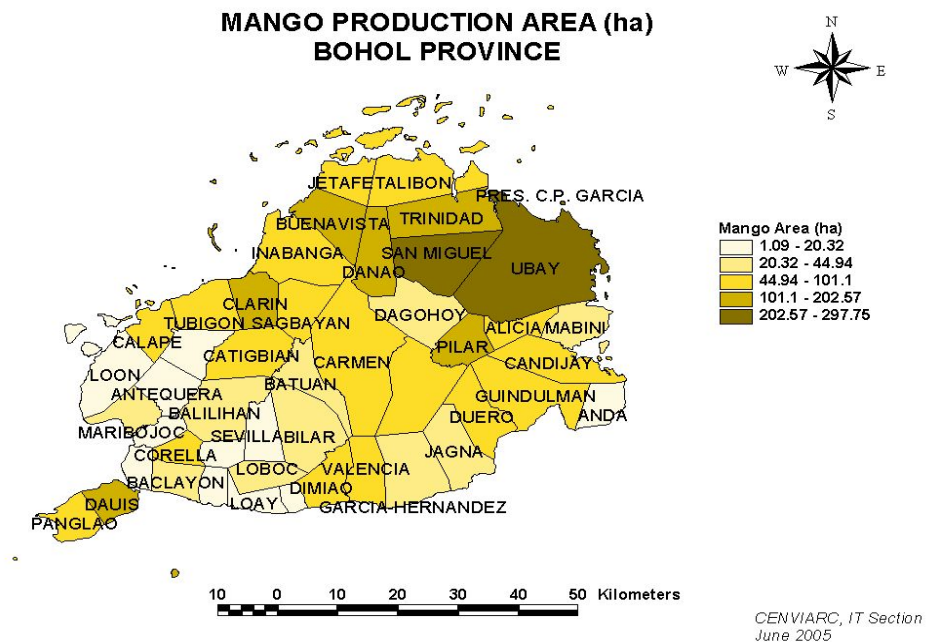


Fig. 10. Mango production areas in Bohol

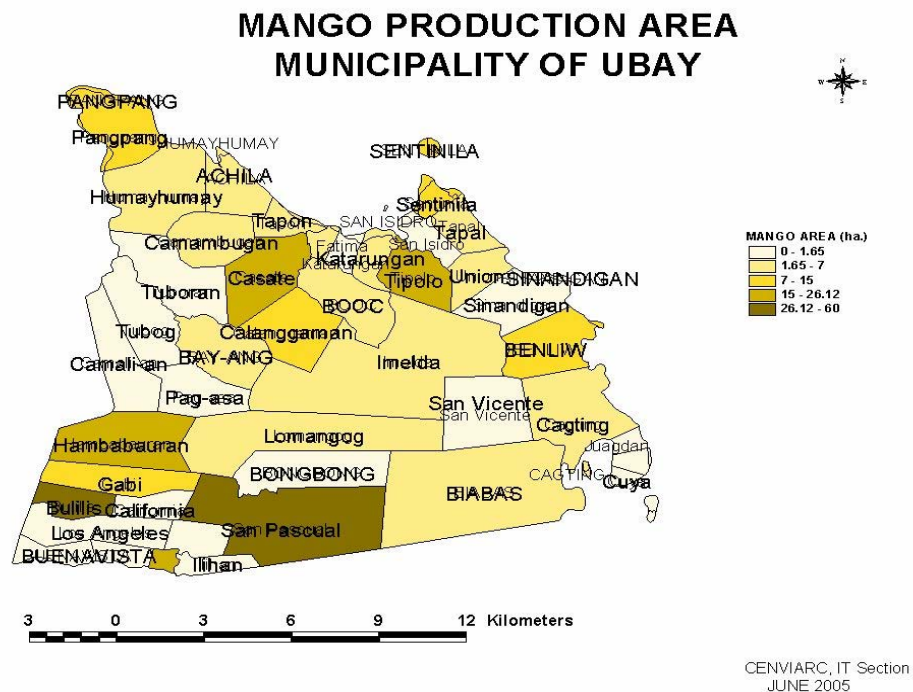


Fig. 11. Mango production areas in Ubay

remove the baggings and haul the fruits, and finally, the escojedor or sorter was hired to segregate the fruits based on the accepted classification standards. The arrangements took many configurations and sharing percentages had evolved as the costs had escalated. If the owner acted as guard of his own trees, he was paid separately for the job.

The Division of Labor in the Mango Industry. A local informant described the mango industry not as a complicated but a “convoluted” system. He said there were just too many players who were not supposed to be there. A brief characterization of each player would be in order:

Planter – one who owned the tree or plantation. He/she got one third of the net income.

Contractor – one who contracted the production of fruits. He/she took charge of the operations from flower inducement, fertilizer application, pest control to harvesting. He/she got one third of the net income.

Financier – one who provided the financial requirement of the planter or contractor. He/she got one third of the net income.

Hired workers – those either working for the contractor on a daily wage or contract basis. They include sprayers, baggers, guards, harvesters, haulers, etc. The rates varied according to task. For example, sprayers were paid P150.00 pesos per day, baggers were paid P150.00 pesos per 1,000 fruits bagged, harvesters were paid P200.00 pesos per day. Guards used to get 10 percent of the net but were now hired on a daily basis.

Buyer – one who bought the produce either as wholesaler, exporter or middleman.

Canvasser – one who worked for the planter or contractor to canvass for potential buyers.

Escojedor or sorter – one who works for either the planter, contractor or buyer to classify fresh fruits according to an accepted classification system.

Retailer – vendors who sold directly to consumers. Some of them were bought directly from contractors or planters. Others sold on commission from planters.

Technology Flow. Most of the production technology resided with the contractor. Many planters generally knew the production process but were ignorant of its many details. It appears that many contractors in Ubay were not native to the area. Many of them came from Cebu and were experienced mango growers themselves. They alleged that mango trees planted near coastal areas produced better fruits. Many of these contractors did not share technologies because of the stiff competition involved. It was the unexpressed desire of each of them to outdo each other in order to corner the market and keep the price high. Some contractors reportedly shared information with other farmers but others were very secretive even to the owners and financiers to the extent that labels were removed from bottles of chemicals to keep them ignorant of the exact kind used. One contractor expressly reported that he never shared technologies with others because it is his trade secret. Contractors relied mostly on their experience. In addition, private company representatives provided them and planters with a host of products which they tried for efficacy every now and then. In the end, many of them used a mix of products considering not only efficacy but also cost and the capacity of the financier to finance the operation. A large operation necessitated a four-wheel vehicle for hauling the supplies and equipment to the site. Since water was a very important requirement, the vehicle was even more important if the site was far from the water source. Spraying was mostly done using power sprayers.

In Ubay, some planters obtained technological information from a government employee who was not formally assigned to work with the mango industry but had had experience and training on mango production having been assigned to work on the commodity formerly. She was also a planter. Many planters shared information among themselves. They also got information from salesmen from different companies. Since the local extension service did not

have any expertise on mango, they were not tapped as a source of technology although they provided seedlings on loan to planters under the Plant-Now-Pay-Later (PNPL) scheme. The many industry players, planters, contractors, financiers, shared information as shown in the diagram below:

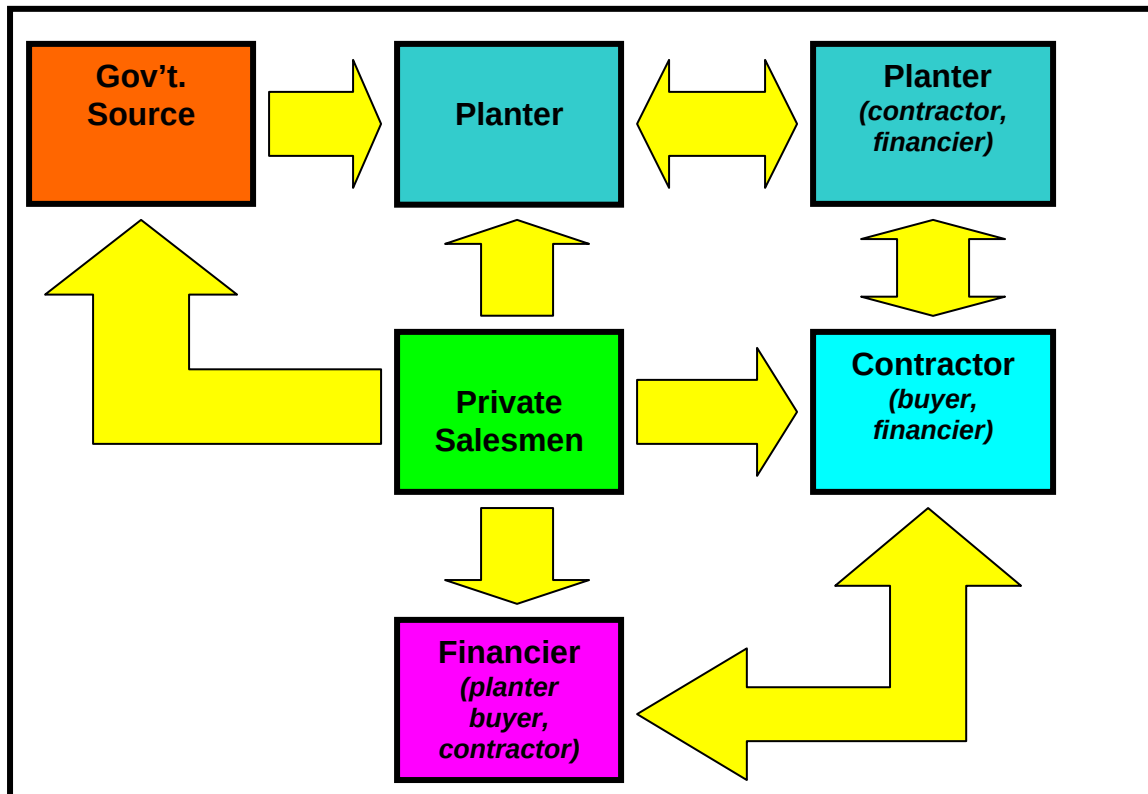


Fig. 12. Technology flow for mango

Production Costs. Shown below is a sample of the cost of production by some growers in Ubay as of 2003. The cost ranged from P637.00 to P6,184.21 pesos per tree and from P.12 to P4.12 pesos per fruit. The details of the cost breakdown revealed that most of the cost was for the chemicals for pest control. Further examination also revealed that some labor costs were not reflected by three planters thereby lowering their costs and causing the wide variations in the total cost estimates. Nevertheless, it can be seen that the cost of production was generally high especially for those with many trees although on a per tree basis the cost was within the reach of small growers (Table 21).

Table 21. Production costs as reported by some Ubay mango planters, 2003.

Plan ter	No of trees	Prod. fruits/ tree	Cost				
			Input	%	Labor	%	Total
D B	500	5000	253,000.00	79.43	65,500.00	20.57	318,500.00
G E	50	1000	51,169.50	96.50	1,855.00	3.50	53,024.50
J S	406	5000	732,147.92	87.21	107,397	12.79	839544.92
E L	104	5000	158,336.00	78.96	42,186.20	21.04	200522.20
L P	750	2500	1,286,100.00	98.00	26,250.00	2.00	1,312,350.00
L A	1,800	1500	9,385,012.00	84.31	1,746,560.00	15.69	11,131,572.00
D P	227	4000	567,387.57	99.56	2,528.78	0.44	569,916.35
T S	115	1800	75,844..80	61.41	47,660.00	38.59	123,504.80

Source: CENVIARC

Table 21. Continued ...

Plan ter	No of trees	Prod. Fruits/ tree	Cost		
			Total	Cost/tree	Cost/fruit
D B	500	5000	318,500.00	637.00	0.1274
G E	50	1000	53,024.50	1,060.49	1.06049
J S	406	5000	839544.92	2,067.84	0.413569
E L	104	5000	200522.20	1,928.09	0.38562
L P	750	2500	1,312,350.00	1,749.80	0.69992
L A	1,800	1500	11,131,572.00	6,184.21	4.122804
D P	227	4000	569,916.35	2,510.64	0.627661
T S	115	1800	123,504.80	1,073.95	0.596642

Marketing. Mango in Ubay was generally marketed to Cebu as many wholesalers, processors and exporters were based there. Some financiers were also buyers. Some were planters, contractors and buyers all in one. Planters and contractors sometimes shared fruits and not cash and sold to different buyers. Some small planters sold directly to consumers. Large producers usually hired canvassers who scouted buyers from within and outside. The bulk buyers also sold to exporters, retailers and processors. Informants reported that there was practically no problem with markets for mango insofar as the ability of the market to absorb the produce was concerned. The major problem in marketing was price, which usually went very low to P10 pesos per kilogram during the peak season. Planters and contractors claimed that at this price, they already lost their profits. One informant even considered P22 pesos per kilo a bad price and P28 pesos a good one. In some cases, prices could go as high as P38 pesos per kilo.

The three major categories of fruits in the market were Export, Good, LO and rejects. The export quality were those that had the correct size, maturity and appearance. Good were those that were not accepted for export because of the relatively smaller size while the LO were those below Good which were still sold as fresh or for processing. The rejects were those not suitable for the market because they were either damaged or infested with pest or disease or whose appearance was not suitable for sale. The classification, however, was another source of mistrust among industry players because it was very arbitrary. The escojedor made the decision where a fruit belonged. Planters, contractors and buyers had their own escojedors and it was expected that the escojedor protected the interest of his employers.

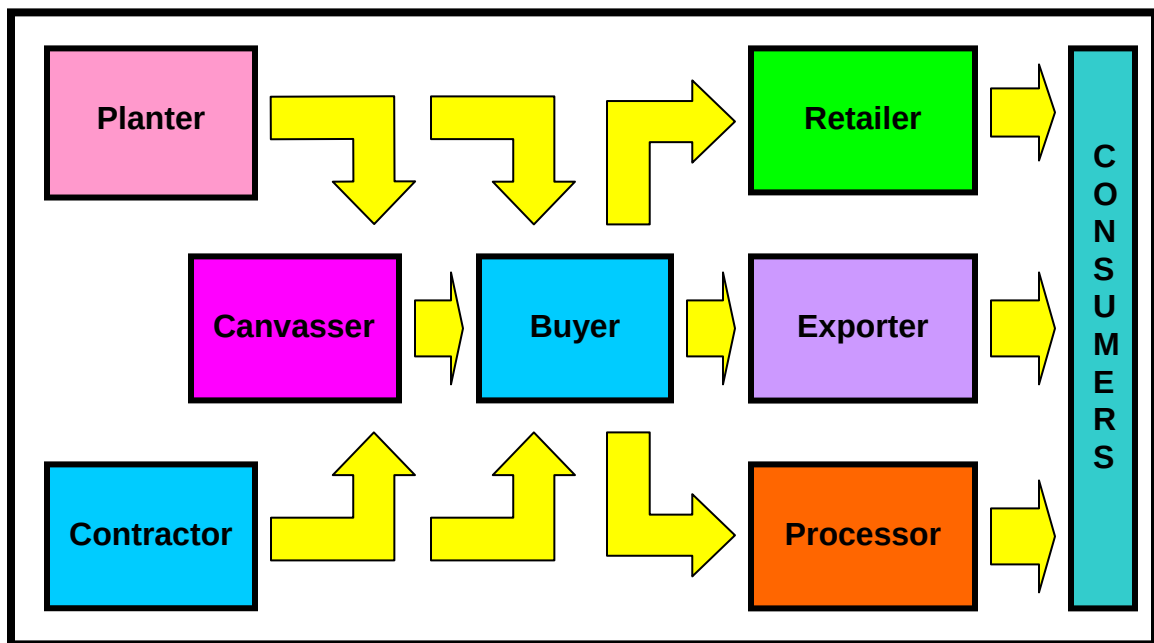


Fig. 13. Marketing flow for mango

Production Constraints. Several constraints were reported by planters, contractors and financiers. It could be seen that the single most important constraint was pests and diseases. Several planters were asked to rank these constraints and it is obvious from the result that pests and diseases were the

predominant constraints. Others included the weather, and, associated with pests and diseases, the high cost of chemicals (Table 22).

An informant was concerned with what he termed the “convoluted” nature of the mango industry. He said there were just too many players that in the end, the planter really lost in the end. And the percentage share of the planters were generally expected to go down to 25 percent as contractors and financiers demanded higher returns for their investments. In many cases, however, the absence of written contracts may have created a constraint in itself because when the crop failed, only the contractor and the financier lost real money and with the uncertainty of success, either through production failure or marketing losses financiers may not fully spend to maximize yields. Under this system of no contracts, all players except the hired workers and the input dealers lost when the crop failed.

Table 22. Major constraints to production ranked by selected planters, 2003.

Planter	No of trees	Constraints (Ranked)				
		1	2	3	4	5
C R	No data	Dry weather High cost of	Piti piti Bad	Bao bao	Worm	
D B	500	Pesticide	weather	Price		
G E	500	Piti piti	Twig borer	Fungus	Fertility	Drought
B S	50	Piti piti	Bao bao	Fertility		
J S	6	Heavy rain	Piti piti			
E L	406	Dry weather	Wind	Pest		
L P	104	Fruit drops	Hopper	Rain	Drought	
L A	750	Drought High cost of	Rain	High cost of pesticides	Wind	Buti/Lapinig
L S	1,800	Pesticide	Pest			
D P	350	Piti piti	Bao bao	Fruit fly		
T S	227	Piti piti	Bao bao	Worm		
VA	115	Piti piti	Lapinig	Bao bao	Bad weather	

Source: CENVIARC

An informant was concerned with other issues affecting plantation agriculture. One was agrarian reform. He claimed that agrarian reform would discourage others to invest in mango production on a larger scale for fear that their farms would be covered by the reform. He was further concerned by the

reported Bureau of Internal Revenue (BIR) interest in their income statements. Other industry players lamented the seeming lack of local and national government support to the industry. A marketing problem was reportedly the cartelization of the mango market. It was claimed that buyers had a cartel and planters and contractors were at their mercy. One significant local planter reported that if he did not inherit the plantation, he would not go into mango production and his projections for the entire mango industry was not rosy. Because of the problems cited above and the inconsistency of the production season. There were years when they experienced no production at all and there were also those when only a part of the plantation produced.

A suggested role for the government was in research, regulation and information dissemination. It was suggested that the government promote, support and regulate the production of good quality planting materials, regulate the standards for marketing and sponsor fora where planters and other industry players could exchange ideas and discuss issues affecting the industry. It was even suggested that organic technologies be introduced to the industry.

Other Subsectors

Coconut. Coconut was the second major agricultural crop of Ubay. A total of 1,480 hectares or 11.42 percent of the total agricultural land were planted to coconuts. Coconut products in Ubay were usually sold in the form of copra, which provided cash income to coconut farmers. Other coconut products were in the form of lumber and tuba (toddy) that can be easily disposed at the local market. The municipal government of Ubay in cooperation with the provincial government of Bohol was establishing a coconut decorticating plant in barangay Katarungan. Budgetary limitations had delayed the completion of the plant. The coconut subsector was estimated to contribute P14,208,000.00 pesos to the local economy as of 2000 (Table 23).

Rootcrops. Rootcrops ranked as the third major crop of the municipality in terms of land area, occupying 1,403 hectares or 10.82 percent. Rootcrops such as cassava, sweet potato, taro and yam were commonly grown in the upland barangays and were principally consumed at home as food for humans and feed for animals. The average yield per hectare was estimated at 8.0 metric tons per hectare with a total annual production of 11,224 metric tons. A total estimated value of about P45 million pesos was generated from rootcrops in 2000 (Table 23). Cassava was the most common followed by sweet potato. Cassava occupied an estimated 720 hectares (2004) and 400 hectares were covered by contract growing schemes with Philstarch Corp., a cassava-flour manufacturing firm based in Carmen, Bohol. The company had its own technology package embedded in its contracting program. The company also provided incentives to communities involved in its contracting program. The barangay with the biggest area was given a two-room school building while the municipality was given a set of computer and printer.

Cassava outside of the contracting scheme was sold in the local market as fresh or grated and dried for feed. The majority of the produce, generally was used as food at home.

Corn. Among the major crops of the municipality, corn was one of the most important and dominant commodities. This was primarily because corn was one of the staple foods next to rice. White corn was the most commonly produced and used mainly as food. Yellow corn, which roughly constituted 20 percent of the total area was under a contracting scheme of Altura's, which operated a feed mill based in Ubay. The area planted to corn was 500 hectares as of year 2000 under the corn production cluster program of the Department of Agriculture. Corn productivity was at 1.7 metric tons per hectare, which was reportedly higher than the national average of 1.35 metric tons per hectare. The value of corn produced as of 2000 was estimated at P8.5 million pesos (Table 23).

Legumes. Legume crops occupied an area of approximately 240 hectares with an estimated annual yield of 720 metric tons and an estimated production value of P5.7 million (Table 23).

Vegetables. Vegetable crops commonly grown in the municipality included eggplant, ampalaya, squash, okra and tomato. Approximately, 26 hectares were devoted to vegetable production in 2000 with a total production value of P783,000.00 pesos (Table 23).

Table 23. Area, production and value of production of various crops, Ubay, 2000.

Crop	Area (hectare)	% to total Ag. Land	Production	
			Total (kg)	Value (P)
Rice	6,249.00	48.21	34,725,000	138,900,000.00
Irrigated	1,160.00	8.95	9,280,000	37,120,000.00
Non-Irrig.	5,089.00	39.26	25,445,000	101,780,000.00
Corn	500.00	3.86	1,700,000	8,500,000.00
Vegetables	26.10	0.20	78,300	783,000.00
Rootcrops	1,403.00	10.82	11,224,000	44,896,000.00
Industrial Crops	1,984.00	15.31	3,036,000	39,408,000.00
Mango	504.00	3.89	1,260,000	25,200,000.00
Coconut	1,480.00	11.42	1,776,000	14,208,000.00
Legumes	240.00		720.00	5,700,000.00
Other Crops	2,558.90	19.74	7,676,700.00	53,736,900
TOTAL	12,961.00	100.00	59,160,000.00	291,983,900

Source: MAO, Ubay

The Poultry and Livestock Subsector

Livestock and Poultry Farms and Inventory of Livestock and Poultry. There were five (5) livestock and poultry farms operating in the municipality located in Barangay Fatima, Gabi, Calanggaman and Tuburan covering a total land area of 104 hectares and employing 45 people (Table 24).

The total population of livestock and poultry was relatively large with swine as the most common livestock and a good number of carabaos and cattle were also reported (Table 25). The number of large livestock in the area may be explained by the sizable area for pasture. Land resource inventory indicated that

the municipality had a total land area of 14,603.80 hectares of open grassland/pasture land, which was equivalent to 49 percent of the total land area. About 3,635 hectares or 25 percent of total grassland/pasture land were intensively utilized as pastureland. These pasture lands were located in Barangays Tubog, 20 hectares, Katarungan, 15 hectares and San Vicente 3,600 hectares. The rest of the areas, of approximately 10,968.80 hectares, were occasionally used for livestock grazing.

The livestock farmers were assisted by the Barangay Livestock Aides (BALA), composed of volunteers who were trained by the Provincial Veterinary Office (OPV). The BALAs were also tasked to monitor the livestock dispersed to the farmers by the national and local governments.

Table 24. Livestock and poultry farms in Ubay, 2000.¹⁷

Name of Farm	Location	Area (has.)	No of Employees
Cecilia's Farm	Fatima	1.00	2
Hector Yu	Calanggaman	1.00	3
Lucky Agriventure	Gabi	100.00	40
Orjalera Farm	Tuburan	1.00	0
Perkins Ong	Calanggaman	1.00	0
Total		104.00	

Table 25. Inventory of livestock and poultry, Ubay, 1998-2000.

Type	Number		
	1998	1999	2000
Cattle	5,100	5,256	5,365
Carabao	7,940	8,200	8,586
Swine	25,300	25,900	26,150
Goats	2,700	3,100	3,752
Poultry	35,200	49,200	30,376
Others	4,200	2,650	3,176
Total	80,440	94,306	77,405

UBAY SMALL RUMINANT RAISERS ASSOCIATION (USRRA)

- Organised by PCC - Ubay in coordination with the Office of the Provincial Agriculture and Office of the Municipal Agriculturist.
- Ubay was the first municipality in Bohol to organize such organization last May 20, 2004
- The members were to be updated with the new technologies in livestock production by the PCC personnel.

¹⁷ This is another example of the lack of proper data in the local extension service. The more important information about livestock operations should have been number of heads, not area.

The Fishery SubSector

Marine and Aquaculture Fisheries. Ubay was a significant fishing town with 19 of its 44 barangays located along the coast. The total number of fishermen had declined probably due to decreasing catch. Various fishing gears had been used by fishermen to catch fish. For the year 2000, estimated fish production of 456.25 metric tons in municipal fishing grounds was reported. The average fish catch was estimated at 2.5 kg per day for non motorized and 6 kg per day for motorized fishermen. The average for all fishermen was 1.75 kg per day. The predominant species of fish caught in the coastal waters of Ubay were Anchovies, Emperor Beams, Flying Fish, Fusiliers, Banana Fish, Needle Fish, Goatfish, Groupers, Halfbeaks, Jacks, Cavallas, Crevalles, Mojarras, Mulletts, Rabbitfish, Sardines, Scads, Slipmouths, Ponyfish, Snapper, Sea Perches, Squirrelfish, Soldier fish, Surgeonfish, Unicorn fish, Threadfin breems, Tuna Mackerels and Wrasses. Aquaculture included brackish water fishponds, fish cages, and fish pens utilizing an estimated area of 1,618 hectares. A total of 1,405 ha. were devoted to milkfish (bangus) production by 82 fishpond operators. Production from aquaculture in year 2000 was estimated at 1,294 metric tons. In 2000, the total estimated value of fisheries products was more or less P70 million pesos (Table 26).

Table 26. Type, area, location, production and value of fishery products, 2000.

Source	Location	Area (ha)	Total Annual Catch (kg.)	Value (P)
Municipal Fishing	20 Coastal & Island Bgy.	20,297	456,250	18,250,000
Fishpond	19 Coastal Bgy.	1,618	1,294,160	51,766,400
Fish Cages	Juagdan	-	-	-
TOTAL			1,750,410	70,016,400

Source: MAO

The fishery subsector was suffering in terms of declining catch, hence, low incomes for fisherfolks because it was beset with problems as articulated in a participatory workshop as follows: illegal fishing, illegal extraction of sand, pollution and improper waste disposal, extraction of corals, illegal cutting of

mangroves (estimated total mangrove area: 79 ha), illegal fishpond construction, and weak enforcement of laws.¹⁸ Nevertheless, several initiatives had been started in Ubay such as mangrove reforestation and a renewed law enforcement program. The latter was evidenced by the relatively large appropriation of about three million pesos for coastal protection. In addition, the local government had activated a Coastal Enforcement and Protection Unit (CEPU). This unit had been manned with additional staff and equipped with modern gadgets such as a fast boat, Geographic Positioning System (GPS). A permanent staff detached from the agriculture office had been assigned and new staff (casual) had been hired. A complement of police personnel joined the frequent patrols, which had been done by the staff. A reactivated Coastal Law Enforcement Council (CLEC) comprised of five municipalities under the leadership of the Mayor of Ubay, provided additional impetus for the coastal protection programs. Unfortunately, fishery resource management programs had yet to be implemented to provide increased incomes for the fishermen. On the part of aquaculture, the industry in Ubay was largely private sector-led.

Fishermen's Organizations. There were 20 Fishermen's Associations in Ubay whose members depended on fishing, fish vending and other fishery related activities as source of livelihood. Many of these associations, however, had no tangible projects which could help increase the productivity nor provide alternative livelihood for their members (Table 27). The Fishermen's Associations were still under the supervision of the Municipal Agriculture Office even as the coastal protection program was administered by the CEPU.

Table 27. Fishermen's Associations in Ubay, 2000.

¹⁸Extracted from CRM Planning Workshop Planning Documents, 2004. Source: MAO, Ubay.

Name of Organization	No. of Members
Achila Fishermen's Association	42
Biabas Fishermen's Association	30
Cagting Fishermen's Association	29
Camambugan Fishermen's Association	24
Cuya Fishermen's Association	40
Fatima Fishermen's Association	142
Guintaboan Fishermen's Association	59
Humay-humay Fishermen's Association	70
Juagdan Fishermen's Association	47
Katarungan Fishermen's Assoc.	22
Pangpang Fishermen's Assoc.	71
San Isidro Fishermen's Assoc.	45
Sentinela Fishermen's Assoc.	28
Sinandigan Fishermen's Assoc.	61
Tapal Fishermen's Association	25
Tapon Fishermen's Association	41
Tintinan Fishermen's Association	35
Tipolo Fishermen's Association	31
Union Fishermen's Association	38
Poblacion Fishermen's Assoc.	39

Factors Affecting Sectoral Performance

Many factors affected the performance of each subsector. In the rice subsector the following factors were significant determinants:

Irrigation. The rice subsector had been the most dominant in Ubay agriculture. Yet more than 80 percent of the areas planted to rice was not irrigated which means that the number one limiting factor was irrigation. Irrigation in Ubay will be increased tremendously with the completion of the Bayongan Dam which will irrigate an additional 3,353 hectares expanding to 17 barangays of the town (Table 28) nearly quadrupling the present irrigated area. Since the irrigation system will also entail expanded road networks, the overall physical infrastructure in Ubay will improve further, thus contributing to the increased productivity of the rice farmers. Within the existing irrigated areas,

however, the many problems faced by the NIA in the maintenance of the physical facilities and the weakness of the irrigators associations will undermine the efficiency and viability of the systems in the long run.

Table 28. Barangays in Ubay covered by the Bayongan Dam Project.

Barangay	Area to be Irrigated	Barangay	Area to be Irrigated
Bay-ang	102	Hambabauran	208
Bood	89	Humayhumay	35
Bulilis	490	Lomangog	187
Calanggaman	324	Pag-asa	169
California	276	Poblacion	60
Camalian	229	San Pascual	69
Camambugan	80	Tubog	180
Casate	284	Tuburan	213
Gabi	358	Sub total	3,353

Source: NIA

Prices of Inputs and Access to Capital. The expansion of irrigation will still be limited by technology not only in terms of the lack of technology itself but by the lack of resources to acquire these. The high cost of new seeds, particularly hybrid seeds, fertilizers and pesticides had hampered production even in irrigated areas. The number of farmers planting hybrid rice, for example had steadily declined since its initial year reaching its lowest so far. Only 16 farmers planted hybrid rice for dry season (DS) 2005. It should be mentioned that there were not many sources of cheap capital in the locality.

Technology. Many rice farmers in Ubay already practiced “modern” technology. They planted new varieties, used fertilizers, pesticides, and other new cultural management practices. They learned these from other farmers as well as from extension agents through individual consultations and seminars. Yet many farmers still did not practice precision in their use of technology. Many material technologies were used only partially such as fertilizers. One important technology that seemed to elude Ubay farmers was one searched for by the BIAPP—a rice-based system that can deal with the inadequacies of water during

the dry season. This inadequacy was compounded by the soil structure in some areas where sand was a substantial soil component such as those near the coastal areas.

Most Ubay mango planters were dependent on contractors and private companies for technology. Therefore, these technologies had been limited to a few individuals and if the individual planters did not have access to these, the mango industry as a whole will suffer since productivity of the industry will depend only on a few who had monopolized knowledge. In addition, technological solutions to problems such as pests must be done at the precise moment or else the whole crop may fail. Even the most confident contractor could not guarantee success because according to him, everything depends on factors beyond his control such as the occurrence of a sudden rain or extended drought. Such seemingly minor technical details as in the removal of ants from the skin of the fruit or a day's delay in the application of pesticide could do minor or extensive damage to the product. A contractor expressed pity on those planters who he said knew nothing about mangoes except only count or eat the fruits.

Land Tenure. Removing land rents from the expenses of the farmers, incomes could significantly increase. Tenure will also affect farmer's attitude towards permanent farm investments. There is still much scope for agrarian reform in Ubay. The municipality had approximately 4,292 hectares of land available for reform. These represented 33% of the total agricultural land. These lands were primarily planted with rice, corn, coconut, banana, fruit trees, root crops, legumes and vegetables. These areas were found in 34 barangays with total beneficiaries of 2,317 (Table 29 and App. Tables 10 & 11). There were Agrarian Reform Communities (ARCs) in the municipality including the barangays of San Francisco and Bulilis (from 1998 to 2004, Phase IV); and Benliw, Cagting, Imelda and Sinandigan starting in August 2004.

It had been alleged that agrarian reform will eventually discourage investors from investing in plantation agriculture. Local mango planters were weary about the prospects of their farms being covered by reform.

Table 29. Land acquisition and distribution as of April 2002.

Item	Scope	Deductible	Working Scope	ACCOMPLISHMENT				BALANCE
				Dec. 31, 01	April 2002	Year to Date	Net	
OLT	117.918	0.7898	117.13	84.4535	3.0817		87.54	0.5934
VOS	43.4678		43.468	38.1861			38.19	5.2617
CA	85.00		85.00				0	85.00
VOS	13.6873		13.687	13.6873			13.6873	
CA	115.223	35.771	79.451				0	
VOS	15.2582		15.256	15.256			15.26	
CA	207.846	59.066	148.77	19.9792		2.173	22.15	126.63
BLT/DPS			22.789	16.566			16.57	6.2232
PAL<5	207.846						0	
VOS	22.7692						0	
GFI	110.606	86.335	24.251	14.0967			14.1	10.154
TOTAL	939.622	181.98	549.8	202.225	3.0817	2.173	207.5	313.31

Source: MARO, Ubay

There were issues that needed to be resolved in order that agrarian reform could proceed smoothly in Ubay. These include:¹⁹ 1. the lack of approved Cadastral survey in almost all of the barangays, hence, properties were still untitled; 2. some farmer beneficiaries refused to be installed due to loyalty to the landowner; and, 3. delay in the implementation of CARP due to the pending petitions of landowners. Other issues include the relocation of Barangay Los Angeles which was to be flooded by the Bayongan Dam; the resolution of the struggle of the militant farmers' organization Hugpong sa mga Mag-uumang Bolanon (HUMABOL) for the Ubay Stock Farm to be distributed to farmers; and the surrender as collateral of the Original Certificates of Title of farmer beneficiaries to Palm Inc., the oil palm investor.

Markets and Prices. Market for mango had been less problematic except for the low prices during the peak of the harvest. Marketing had been almost controlled by the contractors because this had become part of most

contracts. Since many of these contractors had contacts with buyers, financiers and retailers, the problem of disposing of their products had been relatively easier. Their problem with export buyers was that prices for seemingly right-sized fruits had been allegedly manipulated to appear as if they were lower class quality, thus, lowering the price further. They alleged that even substandard sized fruits could be sold to processors. Their most sought after target was production during the second semester. They felt that if they could only harvest from September to December, they could make a large profit because the price of mangoes at this time increased to 100 percent or more than prices during the peak season in the summer months. However, their problem was rain as the rainy season began in June and continued until December. With constant rain, they were afraid all their labor and inputs would go to waste. Even during the dry season, crops could fail. One minor financier reported she lost nearly P100,000.00 pesos in one season and did not attempt to venture into financing again.

Government Support. Informants reported that there was very little that the government had done for the industry, at least in Ubay. Except for the occasional meeting among planters, no other forms of assistance had been rendered by the government to them. The local extension service had no expertise in mango production and even requested planters and contractors occasionally to share their technologies to others during meetings. One informant confided that if there was any tangible intervention that the government might do for the mango industry, it was technology in the control of a certain disease locally called “butig butig” (black spots) on fruits. Another suggested that the government should assist them in the prices of produce but admitted that nothing could be done by the government on this aspect because it is governed by market forces.

¹⁹ As reported by the local Dept of Land Reform Office.

Prospects for the Agriculture Sector

Present and Projected Agricultural Production. In the early years of the Estrada administration, agriculture offices made projections in relation to their food security plan. With year 2000 as the base, projections were made up to year 2012. In Ubay, crop production was projected to increase annually by three

Table 30. Present and projected agricultural production, 2000-2012.

Product	Production in metric tons (mt)					
	2000	2001	2002	2003	2004	2005
Rice	34,725	35,767	36,840	37,945	39,084	40,256
Rice (Irrigated)	9,280.00	9,558.40	9,845.15	10,140.51	10,444.72	10,758.06
Non-Irrigated	25,445.00	26,208.00	26,994.60	27,804.44	28,638.57	29,497.73
Corn	1,700	1,751.00	1,803.00	1,857.64	1,913.36	1,970.77
Vegetables	78	80.34	82.75	85.23	87.79	90.42
Rootcrops	11,224.00	11,560.72	11,907.54	12,264.77	12,632.71	13,011.69
Industrial Crops	3,206	3,302.18	3,401.25	3,503.28	3,608.38	3,716.63
Mango	1,430	1,472.90	1,517.09	1,562.60	1,609.48	1,657.76
Coconut	1,776	1,829.28	1,884.16	1,940.68	1,998.90	2,058.87
Legumes	720	741.60	763.85	786.76	810.37	834.68
Other Crops	7,472	7,696.16	7,927.04	8,164.86	8,409.80	8,662.10

Source: MAO, Ubay

Table 30. ...continued.

Product	Production in metric tons (mt)						
	2006	2007	2008	2009	2010	2011	2012
Rice	42,707	43,989	45,308	46,667	48,068	49,510	50,995
Rice Irrigated	11413.23	11775.63	12108.30	12471.54	12845.69	13231.06	13627.99
Non-Irrigated	31294.14	32232.96	33199.95	34195.95	35221.83	36278.49	37366.84
Corn	2090.79	2153.51	2218.11	2284.66	2353.20	2423.79	2496.51
Vegetables	95.93	98.81	101.77	104.83	107.97	111.21	114.55
Rootcrops	13804.10	14218.23	14644.77	15084.12	15536.64	16002.74	16482.82
Industrial Crops	3942.98	4061.26	4183.10	4308.60	4437.85	4570.99	4708.12
Mango	1758.72	1811.48	1865.83	1921.80	1979.45	2038.84	2100.00
Coconut	2184.26	2249.78	2317.28	2386.80	2458.40	2532.15	2608.12
Legumes	885.51	912.07	939.44	967.62	996.65	1026.55	1057.34
Other Crops	9189.62	9465.31	9749.27	10041.74	10343.00	10653.29	10972.88

Source: MAO, Ubay

percent, livestock, and poultry by 5 percent since it was perceived to be the most dynamic due to technological advances. The fishery sector was projected to increase by 1.3 percent due to rehabilitation measures to be initiated and established addressing the problems cited above (Table 30). It appears, though, that the projection for rice did not take into account the tremendous increase in the irrigated area after the Bayongan dam will have been operational.

Demand-Supply Balance. In the year 2000, rice and corn production was deemed sufficient with a sufficiency level of 491 percent while fish, meat and poultry had a sufficiency level of 181 percent. Starchy roots and tubers had a sufficiency level of 313 percent. Vegetables and fruits were insufficient supplying only 34 and 85 percent respectively of the total requirement of the municipality (Table 31).

Table 31. Existing resource supply and demand in the municipality, 2000.

Food Item	Standard Per Capita Requirement	Year 2000			Remarks
		Existing Supply (kg)	Existing Demand (kg)	Balance	
Rice/Corn Production	124	36,425,000	7,418,548	29,006,452	surplus
Fish, Meat and Poultry	54	5,862,532	3,230,658	2,631,874	surplus
Starchy roots and tubers	60	11,224,000	3,589,620	7,634,380	surplus
Vegetables	39	798,300	2,333,253	(1,534,953)	deficit
Fruits	28	1,430,000	1,675,156	(245,156)	deficit

Source: MAO, Ubay

Projected Demand-Supply Balance. By the year 2007 and 2012, the demand-supply parameters will assume a similar trend. Deficits will still be experienced in vegetables and fruits. Technological advances in rice and corn and the doubling of the irrigated area may boost the production of rice to higher than 3 percent after the completion of the Bayongan dam (Table 32).

Table 32. Projected resource supply and demand in the municipality, 2007-12.

FOOD ITEM	SPCR	YEAR					
		2007			2012		
		Projected Supply (kg.)	Projected-Demand (kg.)	(Deficit)/ Surplus	Projected Supply (kg.)	Projected Demand- (kg.)	(Deficit)/ Surplus
Rice/ Corn	124	44,798,156	9,341,664	35,456,492	51,933,340	11,013,556	40,919,784
Fish, Meat, Poultry	54	7,702,214	4,068,144	3,634,070	9,428,650	4,796,226	4,632,424
Starchy roots & tubers	60	13,804,104	4,520,160	9,283,944	16,002,740	5,329,140	10,673,600
Vegetables	39	981,808	2,938,104	(1,956,296)	1,138,185	3,463,941	(2,325,756)
Fruits	28	1,758,720	2,109,408	(350,688)	2,038,838	2,486,932	(448,094)

SPCR - **Standard Per Capita Requirement**

Source: MAO, Ubay

The projections cited above perhaps assumed that present trends in technology and business will prevail over the period from 2000 to 2012. There were recent developments, which may affect the direction for particular crops.

Prospects for Rice. The prospects for the rice subsector in Ubay are mixed. On the positive side, the irrigated areas will more than double after the completion of the Bayongan dam. The introduction of hybrid rice and the adoption of promising technologies such as System of Rice Intensification (SRI) could lead to higher productivity. The biggest obstacles will be the lack of capital for many farmers. Irrigation will still suffer from the many social problems associated with water allocation, collection of users' fees and system maintenance. Nevertheless, the local extension service, NGOs and the farmers themselves were continuously searching for alternative measures such as low-input and organic technologies to maintain productivity. Overall, production and productivity will increase but prospects for optimizing yields will still be minimal because of the limitations mentioned above.

Prospects for Mango. As reported, there had been continuing planting of mangoes in Ubay as well as in other areas of the province. However, the productivity of the mango industry will depend on precision technologies and a favorable market environment. Production will increase over the years but the productivity of the industry will remain problematic. Increases in labor and input costs will continue to hinder production even as prices remain steady and competition will increase as other areas also increase their outputs. One major consideration for mango producers is the risk of pesticides and chemicals used extensively in the industry. It was reported that in some cases, producers would spray as many as eight to twelve times in one season using various chemical cocktails. On top of this, It had been observed that improper and inadequate safeguards were practiced. For example, spraying was done with minimal protection of the workers who bathed in the sprays they applied owing to the size of the trees. Many trees and plantations were also close to settlements such that the populations of these settlements were exposed to the chemicals during spraying. This was the main reason the MAO, who also owned a few trees, was reluctant to have her trees sprayed.

Planters and contractors were hoping for the expansion of the export market and the establishment of more processing plants that could assure a steady market and fair price for their products. One informant assessed that there was still a huge market for mangoes and that it can absorb all present and future produce.

Prospects for Fisheries. The trend in fisheries productivity will probably continue to decline as a result of the problems discussed earlier. The municipal government along with other municipal governments in the second district had activated its coastal enforcement activities and these were expected to result in the reduction if not elimination of illegal fishing. The measures adopted included intensified sea patrols, arrests and filing of cases of violators, intensified reporting by local residents using mobile phones and other means, market denial for illegally caught fish and coordination with other local governments and agencies

based in Leyte. The local government of Ubay alone invested in additional persons and equipment to strengthen its coastal enforcement activities. Unfortunately, the activities to increase production in terms of new production technology dissemination for mariculture, fish capture and aquaculture were nil.

CHAPTER 4

SUPPORT SERVICES

Government Agencies Providing Support Services to Ubay Farmers

Ubay was uniquely endowed with a large number of agencies in agricultural research and extension that complemented the work of the small Municipal Agriculture Office. These agencies include the following

1. Central Visayas Integrated Agricultural Research Center (CENVIARC). CENVIARC operated several agricultural facilities in Ubay. Its ultimate goal was to develop sustainable agriculture thereby improving the quality of life of farmers and fisher folks. Its plans and programs included the following:

- Technology development;
- Production, distribution and marketing of quality seeds and planting materials as well as improved genetic materials of quality animals and fishery breeding stocks;
- Integration and dissemination of information on agricultural activities;
- Conduct of specialist training courses;
- Provision of laboratory services and technical assistance;
- Collaboration with national research centers and coordination of the following Research Outreach Stations (ROS) in the region under it:

a. Bohol Experiment Station (BES). BES was an experimental station located in barangay Gabi, Ubay. It had a complex comprising of offices, conference hall, staff housing, storage facilities, dormitory, canteen, motor pool and other buildings. Its production and experimental area of 100 hectares were divided into the following components:

- | | | |
|------------------------------|---|-------------|
| • Research area | - | 10 hectares |
| • Seed production area | - | 40 hectares |
| • Plantation crops | - | 45 hectares |
| • Building and road networks | - | 5 hectares |

b. Soil and Water Research and Demonstration Station (SWARDS).

Located at Calanggaman, Ubay, and 6 km. from the BES, it had a total land area of 114 hectares. Of the total land area, 10 hectares were devoted to rice seed production, 2 hectares for water impounding, and 1 hectare for fresh water fish nursery. The rest of the area was devoted to the development of contour hedgerows and pasture for livestock.

c. Ubay Brackish Water Fish Farm (UBFF). This facility was located at the town proper of Ubay. It had a total land area of 18 hectares with 8 hectares devoted to demonstration fishponds for bangus, blue crabs, grouper, prawn, siganid and sea catfish. Ten hectares were intended for aqua-silvipasture research and production.

d. Ubay Stock Farm. The Ubay Stock Farm had a mandate to conduct applied research in the field of animal breeding, physiology, nutrition, health management and livestock integration strategies in the hilly lands in order to evolve better livestock production systems and extend them to LGUs, NGOs and farmers. They were also supposed to produce genetically superior breeding animals and forage and pasture species in support to the livestock industry. It had a total land area of 3,600 hectares, the largest in the country.

2. National Irrigation Administration (NIA). The NIA maintained the Capayas Irrigation System or the Bohol Irrigation Project I (BHIP 1) serving a total area of 1,160 in the five Barangays of Casate, Calanggaman, Bay-ang, Tuburan and Bood.

The Bayongan Irrigation System or BHIP 2 was added and funded by the Japan Bank for International Cooperation (JBIC) having an approved loan of P4.6 billion pesos. It was expected to supply irrigation water to an area of approximately 4,140 hectares in 17 barangays of Ubay, and the towns of San Miguel and Trinidad benefiting some 10,000 farmers.

3. Philippine Carabao Center (PCC). The PCC facilities were located within the USF grounds. Its principal function was to improve the carabao industry through upgrading of native stocks and milk production and processing. It provided advisory and breeding services to clients within and outside Ubay.

4. Philippine Coconut Authority (PCA). The Regional PCA Nursery produced coconut seedlings for distribution to farmers. With the recent favorable trend in the prices of copra, it was noted that the demand for coconut seedlings increased as farmers took a renewed interest in planting coconuts. An estimated 60 hectares were devoted to seedling production in Ubay alone.

Services Provided by Support Agencies and Organizations

Table 34 shows a list of public and private agricultural service providers based in or serving Ubay and the kinds of services they provided. Most of these were agencies under or affiliated with the Department of Agriculture. Their services included:

Research. The various agencies under the DA such as BES and SWARDS conducted research on crops such as rice and rootcrops; the USF on the production of superior animal stocks through breeding and the UBFF was engaged in testing new technologies in aquaculture, mariculture and other fishery technologies.

Seed Production. The BES and SWARDS produced registered and certified rice seeds for distribution within and outside Ubay. Fifty hectares were devoted to seed production by the two stations. The PCA nursery also produced coconut seedlings. There were also a total of seven 7 private seed growers in Ubay.

Technical Support Services. Staff from the various agencies conducted trainings or acted as resource persons in farmer trainings held either at the BES PCC, and USF facilities. Other technical support services were provided through the ecodemo farms within the Ubay Agripark (Table 33).

Animal Dispersal. The USF and PCC dispersed animals to a limited number of farmers. Farmer recipients were required to undergo training, organized and monitored. In addition, these agencies also provided breeding and deworming services to clients in Ubay and other municipalities. An NGO, Heifer International, at one time dispersed a few animals to the beneficiaries of the NRDP program in Tuburan and had promised to give more.

Ubay Agri-Park FITS Center operates three main features:

- *Information Center providing information in print, video and electronic communication;*
- *Technology and Market Center, showcasing techno demonstration projects, business modules, farmers trading and market matching; and*
- *Agri-Educational and Tourism Center*

Facilities

Total Land Area: 100 has.

Mini-Library

Audio/video equipment

Computer with internet access

Farmers' techno demo projects

Nurseries

Farmers' trading center

Salakot w/ dairy bar and souvenir shop

Rodeo arena

Horse race track

Horses for rent

Mini-forest and zoo

Fishing area

Restrooms

The Ubay Agripark

The Agripark was a joint project of the various agencies and the local government of Ubay. It is a facility purposely located within the reservation of the Ubay Stock farm, PCC and the Capayas Irrigation system. The park has facilities including a rodeo arena, a horse race tract, a swine breeding station, flower and ornamental garden, fish pond, training/meeting facilities, agrifair display area, miniforest and other facilities designed to combine and showcase in one place various technologies generated by the various agencies. It was also home to the FITS program under PCARRD_DOST. In order to attract more patrons to the park, the local government had launched an annual Agrifair where local products were displayed and various contests such as horse races and rodeo were held. A floating restaurant on the lake was recently added. The restaurant had been a subject of controversy lately as farmers accused the authorities of withholding the release of irrigation waster from the dam just to allow enough water on the lake for the restaurant to float on.

Table 33. Demonstration projects at Ubay Agripark.

Project	Agency Responsible
Bali Cattle Production	Ubay Stock Farm (USF)
Coconut Nursery	Philippine Coconut Authority (PCA)
Dairy Module W/ Bio Gas	Philippine Carabao Center (PCC)
Decorticating Machine	Fiber Industry Development Authority (FIDA)
Forage Garden	USF
Forest Trees Nursery	Dept. of Environment and natural Resources (DENR)
Fruit Trees Nursery	Provincial Agriculture Office (PAO)
Contour Farming	Soil and Water Research and Dev. Station (SWRDS)
Native Chicken Poultry	Office of the Provincial Veterinarian (OPV)
Natural Farming	Municipal Agriculture and Food Council (MAFC)
Ornamental Garden	Bohol Experiment Station (BES)
Ostrich Project	USF
Rice Production and Water Mgt.	National Irrigation Administration (NIA)
Small Ruminant Production	USF
Tilapia Grow Out	Ubay Brackish Water Fish Farm (UBFF)
Ubi Production & Processing	Agricultural Training Institute (ATI)
Vegetable Production	Agricultural Promotion Center (APC)

Post harvest services. These include milling, warehousing and drying facilities. In Ubay, there were a total of 25 multipurpose drying pavements (MPDP), 35 rice mills and 30 warehouses but still inadequate to support the needs of the local rice industry. Except for the drying pavements, the other facilities were privately owned. Farm-to-market road facilities were inadequate since at present these only provided .58 km/100 hectares of arable land as against the standard requirement of 1.5 km/100 hectares of arable land. Nevertheless, Ubay had a much better and extensive rural road system compared to other municipalities in the country.

Credit Services. The municipality had only one bank-- First Consolidated Rural Bank (FCRB) that served the credit needs of the farmers in addition to the loan facilities provided by national government agencies and local government units. A branch of the Land Bank was recently established in Talibon, more or less 20 kilometers away from Ubay. Quedancor also had an office in Talibon. The majority of the farmers, however, did not avail of formal credit services. They usually obtained loans from informal sources who charged high interest rates of as much as 120 percent.

Irrigation. The Capayas and Malingin irrigation systems provided irrigation to 1,160 hectares in 5 barangays. The NIA also organized Irrigators' Associations (IAs) in their service areas. In addition, small farm reservoirs (SFR) had been constructed in individual farms through the help of the DA. A total of 150 SFRs were reported, allegedly, the biggest in the province and region.

The Capayas Irrigation System

Location: Calanggaman, Bay-ang, Bood, Casate, Tuburan

Service Area: 750 ha., 540 hectares actually serviced

Average Farm Area: 0.80 ha.

Total Farm Lots: 1,397 lots

System Facilities

1) *Dam: Zoned-earthfill; 20.5 m high; 1.16km long*

Reservoir Maximum Capacity: 42mcm

Dead Capacity: 0.7mcm

Effective Capacity 3.5mcm

Spillway Ungated overflow weir Ogee type

Watershed Catchment area: 14.6 sq.km.

Ave. Annual run-off: 9.9 mcm

Main canal 2.9 km.

Lateral Canals 19.4 km.

Service roads Along Main Canal: 2.9 km.

Along lateral canals: 11.5 km.

Services Provided:

1) *Irrigation Service Fees (ISF) - standard ISF= 300 kilos per ha./annum for 2 seasons*

175 kilos dry season

125 kilo wet season

Types of contract:

1) ***Type III*** - 50-50% sharing of collection (NIA is responsible for the operation & the Irrigator's Association for the maintenance)

2) ***Type II*** - Irrigators Association is responsible for the maintenance of canals (lateral) and collection of ISF; they get 15%- if they get 90-100% irrigation service fees

- *payment of PhP1,500 ISF for 35 km L/R lateral canals*

- *range 60% and below of ISF collection, no share for irrigators association; 61 -75% - IA gets 5%; 76 - 90%, 10%;*

- 91 - 100%, 15%*

- *if the IA pays earlier or before due date, they get 10% rebate*

3) ***Type I*** - cleaning the canals is the main function of IA; more collection of fees but will pay the standard fees

Many problems plagued the irrigation system. These include: limited irrigation water supply; poor canal maintenance; deteriorated irrigation facilities;- lack of funds for IAs and NIA; illegal turn-outs; cropping calendar not properly followed; water delivery and schedule not properly followed; poor and low ISF

collection; poor leadership, poor participation of members and; and, poor implementation of IA policies.²⁰

A summary of agencies public and private and their services in Ubay is listed below (Table 34).

Table 34. Agricultural facilities and other related services in Ubay.

Agency/Facility	Services Provided
Philippine Carabao Center (PCC), Lomangog	Technical advisory services, Breeding services, Gene pooling, upgrading of native breed
Ubay Stock Farm, Lomangog	Technical advisory services, Livestock Dispersal Program
Bohol Experimental Station (BES), Gabi, Ubay	Research, production and distribution of quality seeds, ornamental plants, fruit trees, crops
National Food Authority	Grains buying and storage
NIA (Capayas Irrigation System)	Irrigation services
Ubay Brackish Water Fish Farm	Research and development in mari/aquaculture
Soil and Water Research and Demonstration Station	Research and development; seed production
Philippine Coconut Authority	Production and processing technologies, Seed nut production
Office of the Provincial Agriculturist	Funding, technical assistance and coordination on various programs; Low-input rice production technology
DA-RFU	Funding, technical assistance and coordination on national banner programs
DA Agricultural Promotion Center (APC)	Technical assistance and coordination on national banner programs
DA-Agricultural Training Institute (ATI)	Trainings
DENR	Forest tree nursery at AgriPark
Central Visayas State College of Agriculture, Forestry and technology (CVSCAFT)	Low-input rice production technology, sustainable Agriculture Technology
SEARice,	Low-input rice production technology
First Consolidated Bank, Ubay	Credit services
Fishery Improved for Sustainable Harvest (FISH)	Coastal resource management program
Project Seahorse	Coastal resource management program
Heifer International	Livestock dispersal
Counterpart International	Financial assistance
Atlas Fertilizer Corporation	Fertilizer technodemo
Alturas'	Corn production financing and marketing
Philstarch Corporation	Cassava production technology; contract growing

²⁰ The problems in the CIP had not changed over the years. These problems were noted early but nothing seems to have worked to solve these. See various reports of BIAPP.

CHAPTER 5

THE MUNICIPAL EXTENSION SERVICES AND KNOWLEDGE MANAGEMENT

The Role of Municipalities under the Local Government Code (RA 7160)

It will be useful to look at the legal context under which local agriculture offices operate. Under the Local Government Code (LGC) of 1991 or RA 7160, agriculture services was devolved to the provincial, city and municipal governments. Municipalities, according to the LGC, are to provide “*Agriculture and fishery extension and on-site research*” through:²¹

- a. Dispersal of livestock and poultry, fingerlings, and other seeding materials for agriculture;
- b. Establishment and maintenance of seed farms for rice, corn, and vegetables, medicinal plant gardens, seedling nurseries for fruit trees, coconuts and other trees or crops, and demonstration farms;
- c. Enforcement of standards of quality control of copra and improvement and development of local distribution channels, preferable through cooperatives;
- d. Maintenance and operation of interbarangay irrigation systems;
- e. Implementation of soil and water resource utilization and conservation projects; and
- f. Enforcement of fishery laws in municipal waters, including conservation of mangroves.

It must be noted that in the above functions, there was a mixture of extension, support services and regulation. Furthermore, certain functions were better left to the private sector such as the establishment and maintenance of seed farms, nurseries, etc. or better capable agencies such as those of regulating the quality of copra. Besides the coconut industry was served by a national agency—the Philippine Coconut Authority (PCA) and LGUs did not normally include coconuts under their extension service.

²¹ Art. 25, IRR, RA 7160.

Under this mandate, however, LGUs took liberties to do everything they wanted. Yet most of them only carried through what the DA did before devolution. Most often, LGUS did not have their own programs but implemented mostly the national banner commodity programs funded and administered by the national government through the DA. These programs, which took various names under various administrations, carried with them funding for implementation and subsidies. In addition, incentives for devolved staff were also provided, hence, there was a tendency to just ride on to these programs. The net result was that many LGU staff acted like they were still under the national government in terms of programs.

Functions of the Municipal Agriculture Officer/Agriculturist in the DA structure¹

- a. *Should establish and maintain a municipal office with the following information/resource materials:*
 1. *municipal map*
 2. *manpower development*
 3. *project locator board*
 4. *organizational chart*
 5. *municipal profile*
 6. *project status report*
 7. *logbook*
 8. *municipal nursery, and*
 9. *training needs assessment of municipal personnel including himself.*
- b. *Should conduct consultative review and fine-tuning of AT work plans and on this basis prepares his/her supervisory work plan.*
- c. *Should prepare municipal integrated agricultural development plan for presentation and eventual incorporation to the overall municipal and provincial development plans.*
- d. *Should conduct monitoring, supervisory visits and evaluation o :*
 1. *monthly monitoring of project status*
 2. *mid and year-end program review and*
 3. *semestral performance audit of municipal personnel.*
- e. *Should organize and conduct annual agri-food fair in the municipality in coordination with the Municipal Agriculture and Fishery Council. Should aspire to nominate contestants to the DA Search for Agriculture Achievers.*
- f. *Should establish and maintain consultative linkage with government and non-government organizations for technical assistance and to facilitate resolution of problems/issues.*
- g. *Supervise the promotion of agricultural cooperatives development through information dissemination.*
- h. *Should keep abreast with recent developments regarding agriculture and related fields through readings, subscriptions of magazines, journals, etc., membership in organizations and attendance to seminars, trainings workshops and symposia that will lead to his/her professional/cultural growth.*
- i. *Should prepare and submit promptly required monthly accomplishment reports.*

*The Municipal Agriculturist in the Local Structure:
In the functional structure of the municipality, the
Municipal Agriculturist was mandated thus: The MA
"shall take charge of the office of Agricultural
Services and shall perform such functions as
prescribed in the code"*

The Role of LGUs under the Agriculture and Fisheries Modernization Act

In 1997, a new law—The Agriculture and Fisheries Modernization Act or AFMA (RA 8435) reiterated the role of LGUs: “LGUs shall be responsible for delivering direct agriculture and fisheries extension services.”²² The law further specified the activities that would rightfully fall under extension such as training services, farm or business advisory services, demonstration services, information and communication support through trimedia.²³ Under this law, it would have been easier for LGUs to perform their functions because the functions were very specific. Nevertheless, LGUs were generally unable to shift because national programs continued to be implemented under pre-AFMA schemes and very little local programs were funded by the LGUs themselves. Seemingly, it was better for LGUs to adopt a much broader approach to extension services by putting anything they did in agriculture as agricultural extension service.

The Municipal Agriculture Office Personnel

Vision of OMA:

The emergence of Ubay as an agri-aqua production center for Bohol with self-sustaining, modernized, well-organized and empowered farmers and fisherfolk performing sound and profitable agribusiness enterprises

Mission:

- 1. To provide quality services and technologies that will support the efforts of farming and fishing communities to attain sustainable productivity and increase their real income;*
- 2. To increase farm productivity and produce quality products by practicing the modern agriculture and fishery technologies without sacrificing our environment;*
- 3. To capacitate farmer and fisherfolk organizations by providing trainings and coordinate with concerned agencies in project implementation.*

As of May 2004, Ubay had a total of 121 plantilla (permanent and required) positions, 119 of which had been filled. Of the 121 positions, 28 were considered officials and 93 were employees. Sixty percent of these were graduates of college and 62 percent were between the ages of 31 to 50. In the official plantilla, the Municipal Agriculture Office had one position for Municipal Agriculture

²² Sec. 90, RA 8435.

²³ Sec. 87, RA 8435.

Officer (MAO) and six Agricultural Technologists (ATs).²⁴ The regular positions of MAO and AT were filled from those devolved and the replacements of those who retired. There were nine other staff who were hired as “casuals” or temporary mostly to augment the technical services and partly to provide clerical and general support services. Of the nine, five were hired as agricultural technologists, three as laborers and one as clerk. One of the regular ATs was reassigned to the CEPU. The hiring of temporary technical staff (AT) showed that the present regular technical staff strength was inadequate because of the size of the municipality. Among the crops section staff, the average number of barangays covered by one AT was 11 and the livestock AT covered all of the 44 barangays. The Fishery Aide who was a provincial employee covered all the 19 coastal barangays. Based on the estimated number of farmers in Ubay, each crop AT served more or less 1,200 farmers. The MAO did not give any barangay assignments to the casual ATs because they were paid on a daily basis and did not receive any allowances. However, they were mobilized for barangay work whenever they were needed. This number also showed that the local government was very interested in improving the service delivery in agriculture.

The MAO had already 25 years experience rising from the position of AT after the former MAO retired receiving a current salary of PhP15,129.00. Two ATs were already 27 years in service and receiving a current salary of PhP10,048.00 and the other two ATs were receiving a monthly salary of PhP8,444.00 each. Casual staff received a daily wage of P125.00 pesos with no other compensation. The staff were divided almost nearly equally between male and female.

In terms of educational attainment, the MAO had 24 units in her Master in Science degree and has AEO eligibility. One Agricultural Technician (AT) had a Bachelor of Science degree and had AO eligibility, another AT had career service eligibility, while the two other ATs finished BS courses. All of the professional technical staff completed four-year agriculture or related courses. Most were

²⁴ The most recent recruit, a veterinarian fresh from the university and just got his license recently died vacating another position in the organization and paralyzing its livestock extension services.

trained on various occasions, except the most recently recruited, on various subjects especially rice. Not one can be considered an expert on any other crop except the livestock staff.

The Municipal Agriculture Office Organizational Structure

The structure of the organization was very simple mainly because of its small size. It was relatively flat allowing for easier supervision, coordination and communication. The office was not considered a separate department within the municipal government structure but was under the direct control of the office of the local chief executive. Most of the time, however, the general administration of the office was placed under the Municipal Agriculture Officer (MAO). The MAO was an inherited position from the national government. The municipal government may elevate her position into a department head level by making her Municipal Agriculturist and co-equal with other mandated department head positions in the local government plantilla. The MAO, while fully under the jurisdiction of the local mayor not only received instructions from the local government of the municipality but may also receive instructions from the provincial government and the national government by virtue of the limited administrative control of provincial governors over the municipal government. In the exigencies of the national priority programs in agriculture, the MAOs also received instructions from the Department of Agriculture through its Regional Field Office (RFU). In exchange, they were provided various forms of assistance and incentives.

The local structure was still generally reflective of the previous one when they were still in the national government (Fig. 15). Staff assignments were classified into major commodities such as Crops, specifically grains and high value crops (HVC), livestock, and fisheries.²⁵ All technical professional staff except for two were assigned to crops, mainly rice and one, among the crops

²⁵ The fishery component and staff had been lately separated from the agriculture office to merge with the local environment and natural resources office. Hence, all programs in this area had been effectively removed from the MAO.

technologist was assigned to high value crops. In addition, all of the field extension staff were assigned to oversee the overall agriculture situation in specific barangays where they were assigned except for the livestock and HVCC personnel who covered the whole municipality. Therefore, a particular staff may be assigned to grains but concentrated only in a specified barangay or cluster of barangays.

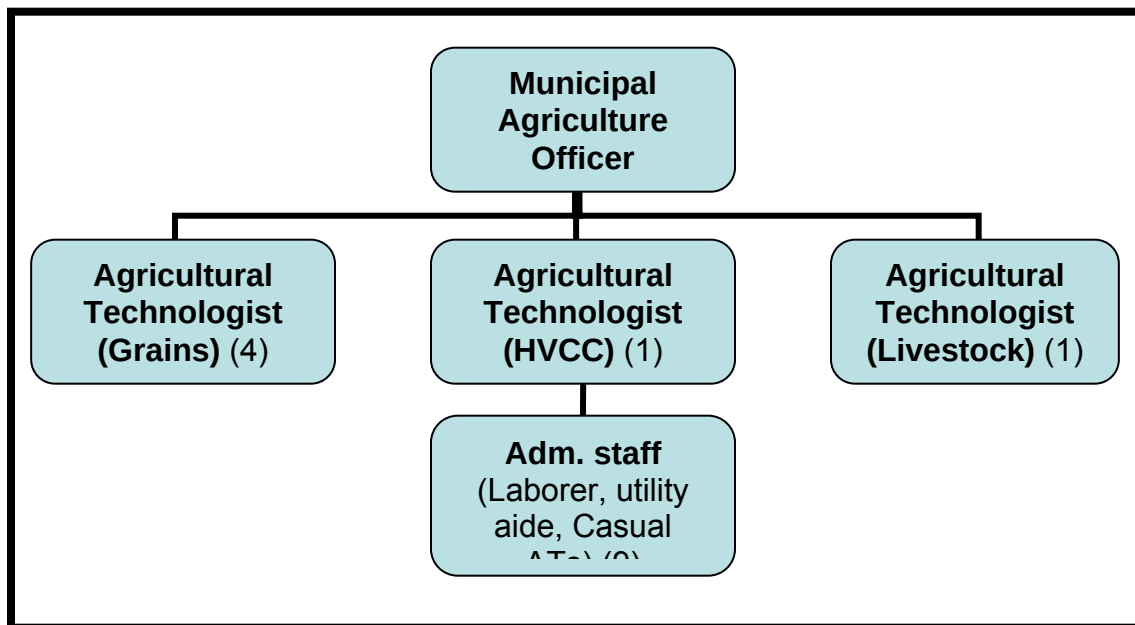


Fig. 14. Structure of the Municipal Agriculture Service.

Staff Morale

The local extension service suffered formerly from a lack of leadership and support from the former local government leaders. With the new MAO, the staff had regained some dynamism and the local Chief Executive had shown support for agriculture both, morally and financially. One recent recruit had been made regular and job-order laborers who were assigned to the office occasionally. Hiring the latter was a waste of money because these workers had no substantial tasks and did not contribute significantly to efficiency. In fact, the MAO did not exactly know which workers were assigned to her office except for some who were doing tasks directly under her supervision. In general, the staff had high

morale owing to the relatively better pay and logistical support, dynamic and humanistic leadership of the MAO plus the support of the local chief executive.

Morale was somehow very much influenced by the logistical support provided to the OMA by the local government. The staff enjoyed better salaries compared to similar positions in other municipalities because Ubay had a higher income class. They were also given other mandated allowances and enjoyed a reasonable gasoline allowance. The MAO retained her Representation and Travel Allowance (RATA) despite the fact that in many municipalities, replacement MAOs were no longer given such.

Program Planning

The problem of the local extension service seemed to be that there was very little analysis done by the staff to see where they could be most effective considering their logistical limitations and the potentials of the locality. For example, there being a substantial and growing mango industry in the municipality, the LGU could have taken the leadership to provide support to local growers in terms of a tangible program to support the industry. As of now, the industry was left to itself. There was also no effort to gain expertise on the part of the staff on mango production so that they could truly provide leadership in this subsector.

Another problem was pinpointing what service should be provided by the LGU and which should be left to other providers. Should the LGU propagate and sell seedlings? Should it maintain a breeding service? An incubator service? Alternatively, was it better off continuing with its present framework of providing whatever services were needed by the clientele?

The only semblance of a plan was the yearly target set by the staff as to how many hectares shall be covered by the national banner programs and what other activities shall be implemented on minor commodities for the year. So the plan was a simple yet long list of activities under each commodity (refer to App. Table 12). Some of the staff were involved in a participatory planning for the

fishery subsector, but they never carried the process through to the total agricultural development plan for the municipality.

National vs Local

One source of bewilderment from observers was how the local agriculture staff and the national agriculture agency differed in their perceptions of programs. While the national agency looked at programs in terms of targets based on their own ideas that were relatively high, the local staff usually set more realistic targets, which were relatively lower. This difference of perceptions occurred every time the national staff called for conferences. Eventually the local staff allowed the regional personnel to use their figures regardless of whether these were achievable or not. For example, the national agency staff, assuming that Ubay has a large rice area would set targets for planting hybrid rice at 500 hectares. The local staff, knowing that this was not achievable would indicate a much, lower areas at 60 hectares. The national staff would even go to the extent of threatening the local staff of sanctions like reporting to them to the local chief executive for lack of cooperation. In the end, the actual number of planters and area would even be much lower than 60.

Program and Personnel Monitoring and Evaluation

The MAO went to the field frequently to monitor her staff and programs. She also went to the field especially whenever her presence was needed such as during community functions, organizational activities, meetings, etc. National commodity programs were monitored by provincial and national agencies and the required forms were submitted. Monitoring was very informal but she had reinstated the semestral evaluation of her staff. She refused to sign the Daily Time Record (DTR) of the province-paid Fishery Aide for delicadeza. Her leadership style had fostered cooperation among the staff.

Programs and Projects

The programs, projects and activities are listed in Appendix Table 12. This long list contained a wide range of agricultural commodities indicating the diversity of production activities that farmers were engaged in but the principal activities, as indicated by the staff assignments were confined to rice production. Other commodities with some emphasis included corn, mango, and livestock. The fisheries program was limited to the assistance to fisherfolk organizations. A new initiative to activate inland fisheries was started. It consisted mainly of

stocking small farm reservoirs, dams and other inland water bodies with tilapia fingerlings.

Services Provided by the Municipal Agriculture Office

Local and national agricultural service agencies had been providing services to the farmers in various ways. The services provided by the major provider – the LGU can be gleaned by the list of programs and projects in App. Table 12. These programs and services can be grouped into the following categories:

Farm Advisory Services. The major component of the local extension service was the provision of technical advice to farmers in terms of transmitting technical information through informal contacts, meetings, seminars and trainings, office calls and farm visits. These activities took most of their time ranging from 70 – 80 percent.

Material Input Assistance. The local government had been extending not only technical advisory services but also material inputs such as seeds, seedlings, animals and other inputs through various programs such as plant-now-pay-later scheme for mango, animal dispersal, fingerling dispersal, seeds for field trials, etc. In addition, subsidized seeds, fertilizers and chemicals had been provided especially to rice farmers, corn farmers and others through the various national commodity programs by both provincial and national governments. Local animal dispersal programs had been long running and to date (Aug. 2004) had distributed 32 carabaos, 79 cattle, 410 swine, 5 goats, and 473 chickens.

Institutional Development. The field extension staff had organized farmers, fisherfolk, women and other sectors for the purpose of minimizing the need to contact each individual farmer considering the scope and number of farmers being served by a few field extension staff. Consequently, these organizations were envisioned to implement projects that would help generate

income for the members whenever applicable. The organizations also served as conduits of assistance to individual members. Unfortunately, however, most of these organizations were weak partly from the lack of enough time and skill on the part of the staff on organizational development. The absence of any real economic benefits from these organizations was blamed as the major source of their weakness. At present, the number of organizations included: 18 Farmers' Associations with 707 members, 10 Rural Improvement Clubs with 278 members and 19 Fishermen's Associations with 969 members. The staff considered organizations as indispensable in their activities because without these, they claimed, they could only reach a very limited number of clients.

Facilitative Services. A good part of the work in the field consisted of facilitating farmers' and collaborators' needs and activities. These include facilitating the acquisition of material inputs such as seeds of rice, corn and vegetables, equipment such as mechanical threshers, shallow tube wells (STW), solar dryers, small farm reservoirs (SFR), animal stock, fingerlings, vaccines and other medicines. These materials had been acquired as either loans or outright grants from various agencies such as DA, BFAR, OPA and OPV. The local office also facilitated activities such as mobilizing farmers for meetings, information gathering, trainings, etc. of partner agencies such as the OPA, DA-RFU, NGOs and other agencies and private companies.

Pest, Disease and Force Majeure Surveillance. Field extension workers were required to monitor the occurrence of pests and diseases in order that quick action could be made in case of outbreaks. They were required to make reports to higher offices as the need arose. In addition, staff were also required to make assessment reports on damage from El Niño whenever it occurred.

Data, Anyone?

During the last drought, the MAO reported the damage to the provincial authorities as did the other MAOs from other municipalities. Using her own figures as a basis, she estimated the damage at 90 million pesos. This allegedly took the attention of the Governor in the sense that he could not believe the figures. As a result, the provincial government conducted an actual damage survey which necessitated stopping all other activities for days. The purpose of the survey was to get the real extent of the damage but it seemed that it was also done not to make the local officials look bad.

Conflict Resolution. Sometimes the staff were involved in settling problems involving clients such as the disposal of dispersed animals, irrigation water allocation problems, and other conflicts in the field. They were also involved in organizational problems. These tasks were, however, very minor and occurrence of conflicts that needed their attention was rare.

Dynamics in the Provision of Agricultural Extension Services

The extension service in Ubay was very much patterned after the national program structure under four major banner programs such as cereals/grains, livestock, high value crops and fisheries. This was reflected in the structure of the organization where staff were assigned according to these commodity groupings. Only one staff was assigned for each the three commodities such as livestock, high value crops and fisheries and the rest of the staff were assigned to grains, mainly rice. Therefore, there was a lopsided emphasis on rice among all the commodities.

Service was extended on a regular albeit highly unstructured manner. Clients either were visited or came to the office for assistance. Nevertheless. Most rice farmers were seemingly knowledgeable of the technologies in rice such that most assistance sought were in the form of availing the incentives offered by the national government. It must be pointed out that the number of farmers adopting the hybrid rice technology in Ubay had been minimal and decreasing over the seasons. In 2005, however, the local government used its calamity fund of about P500,000.00 pesos as a result of the El Niño occurrence to subsidize rice production using hybrid varieties. The number of adoptors of hybrid rice necessarily rose yet the amount for subsidies was not fully used because many

farmers had already planted other varieties. They were mostly growing the inbred lines.

Trainings were conducted occasionally involving local staff and occasionally staff from the provincial agriculture office. The rice farmers in Ubay, notably in the irrigated areas were beneficiaries of a special program jointly implemented by the national government, the Japan International Cooperation agency and the local government through the Bohol Integrated Agricultural Promotion Program (BIAPP). So most of the technologies learned by the farmers in the irrigated areas were those promoted under the program. Under this program, field trials on new rice varieties and other rice-based cropping systems were conducted and closely monitored and institutional capability building for the irrigators' associations was also implemented. Most often, new seeds were introduced through technical briefings which were done in two hours.

The strategies employed by the staff to serve their clients include:

Coordination and Complementation among Related Agencies. Under the purely local service which was fully implemented after the phase out of BIAPP in 2001, the services to the rice areas were continued but at a much reduced intensity due to lack of resources. Nevertheless, the OMA coordinated with other agencies on particular activities and farmers were provided certain services either as individual agencies or in cooperation with the OMA. A summary of the coordination and complementation of services can be illustrated by Tables 35 and 36, showing the various services along the value chain in rice and mango.

Office Calls. Many farmers came to the office to consult with the staff on just about every thing pertaining to agriculture. Some came to inquire about seeds, others to consult about livestock. In general, prior appointments were nearly impossible to make because of the lack of communication facilities although a few clients were reported to contact the staff via cell phone. In many cases, a caller came to the office anytime hoping to see the staff concerned. In

any case, there was always staff in the office who took note of the object of the visit and referred it to the relevant staff when he/she arrived.

Farm Visits. Farm visits took up most of the time of the field extension staff. They estimated that about 80 percent of their time was devoted to these activities. These visits were mostly to provide technical advise, monitor crops, pest and disease surveillance, and deal with specific farm problems brought to their attention by the farmers. These visits, however, were not structured in such a manner as to determine specific routes on certain days so that it would be easy to monitor staff movement within his/her service area. In other words, the visits were based on perceived and reported needs for services. Since all barangays were readily accessible by all forms of transportation, field staff had no problem reaching them except that many of these barangays could only be reached by motorcycles private or for hire. In many cases, transportation cost was comparatively high because the paucity of passengers made the service very expensive such that a 4 km trip from Mabuhay to Gabi, for example, cost thirty pesos (P30) compared to the fare for the jeep or bus from town to Lomangog, which cost only 6 pesos for the 8-kilometer distance. If one had a motorcycle of his own, reaching the barangays would be no problem. For monitoring, the staff had forms to fill out which included data on yield estimates, areas planted and problems met. It was noted that the forms kept on changing such that the consistency of data suffered.

Community Organizing. Field extension staff saw the indispensability of organizations. They claimed that they could not reach all farmers and other clientele on an individual visit. They usually used the organizations as channels for delivering information, holding meetings and briefings and as a venue for discussing other concerns. The organizations were mostly designed not to accomplish certain tasks or projects but as a forum for various concerns of the

Table 35. Extension and support services through the value chain in rice.

Process	Service Providers		
	LGU (Mun. Agriculture Office)	DA & Allied Agencies (OPA, OPV, DARFU, APC, BES, SWARDS, NIA, NFA)	Private Companies/Organizations (Quedancor, First Consolidated Bank of Bohol, Inc., private dealers, Altura's, BOFAMCO, Seed companies, other seed growers, Private buyers, haulers, warehouseers, millers)
Accessing capital/inputs	Facilitative services	Supply of inputs based on GMA program targets: Seeds, fertilizers)	Provide capital through loans. (Quedancor, First Consolidated Bank of Bohol, Inc.
Land preparation		Irrigation services (NIA)	Custom plowing: Carabao/tractor
Seed procurement	Information services on sources of seeds; Facilitative services on seed procurement/ accessing new varieties; technical briefing on new varieties	Supply of seeds (BES, SWARDS)	Supply of seeds (Seed growers, BOFAMCO, Seed companies)
Seedbed preparation	Technology dissemination on seedbed preparation	Technology dissemination (through the MAO)	Technology dissemination (Seed growers, companies)
Weed control	Technology dissemination on weed control (Mechanical, chemical)	Technology dissemination (through the MAO)	Technology dissemination (Private weed control chemical dealers, mechanical weeder manufacturers, dealers)
Fertilization	Technology dissemination on fertilization (inorganic, organic, Balanced Fertilization)	Technology dissemination (through the MAO)	Technology dissemination (Private fertilizer dealers)
Pest & disease control	Technology dissemination on pest & disease mgt. (inorganic, organic, IPM)	Technology dissemination (through the MAO)	Technology dissemination (Private dealers: insecticide, fungicide, molluscicide)
Water mgt.	Technology dissemination on water mgt. (SRI)	Technology dissemination (through the MAO) NIA: Water scheduling	
Harvesting			Harvesting and threshing services (Private dealers of threshers, contractors: Use of mechanical threshers)

Hauling			Transport services: Private transportation: trucks, jeeps, tricycles, etc.
Warehousing		Warehousing services: NFA	Warehousing services: Private (Altura's)
Buying	Information dissemination on prices?	Buying services: NFA	Buying services: Private (Altura's)
Milling			Milling services: Private (Altura's, other millers)

farmers. Not one among the staff, however, was not trained in community organizing.

Trainings. Trainings were conducted occasionally depending on the availability of funds and resource persons. In other times, meetings were used to introduce new technologies. Attendance in these trainings, however, also depended on the schedule and interest of the farmers. It seemed that the immediate need of the farmers at present was not new technologies on rice per se but support services such as credit and marketing especially the former. In the mango industry, the most common need was the technology for control of disease especially the “butig-butig” (black spots on the fruits causing decay) which, even experienced contractors had found no solution yet. In the fishery sector, the declining catch was the most important problem and no solution had been devised so far. Yet destructive fishing continued despite the existence of the CLEC or Coastal Law Enforcement Council. Ubay had a long and erratic coastline making law enforcement difficult especially with the limited manpower and other resources.

The number of trainings declined through the years and for rice, trainings consisted only of a more or less 2- hour technical briefings. Trainings on livelihood projects were also done in collaboration with the Municipal Social Welfare and Development Office (MSWDO).

Table 36. Extension and support services through the value chain in mango.

Process	Service Provider		
	LGU (Mun. Agriculture Office)	DA & Allied Agencies (DARFU, APC, BES)	Private companies/Organizations (Financiers, contractors, private dealers, seedling growers/suppliers, Private buyers, haulers, warhousers)
Seedling procurement	Information dissemination on seedling sources, supply of seedlings	Information dissemination on seedling sources	Information dissemination on seedling sources, supply of seedlings
Planting	Technology dissemination on site selection, planting distance,	Technology dissemination on site selection, planting distance,	Technology dissemination on site selection, planting distance, etc.
Farm maintenance	Technology dissemination on fertilization weeding, etc.	Technology dissemination on fertilization weeding, etc.	Technology dissemination on fertilization weeding, etc.
Flower inducement	Technology dissemination on flower inducement	Technology dissemination on flower inducement	Technology dissemination on flower inducement; supply of inputs (flower inducers)
Pest/disease control	Technology dissemination on pest/disease control	Technology dissemination on pest/disease control	Technology dissemination on pest/disease control; supply of inputs
Fertilization	Technology dissemination on fertilizer, vitamin application,	Technology dissemination on fertilizer, vitamin application,	Technology dissemination on fertilizer, vitamin application,
Bagging			Supply of newspaper, bag preparation, bagging services
Guarding			Guarding services
Harvesting	Technology dissemination on proper harvesting techniques	Technology dissemination on proper harvesting techniques	Technology dissemination on proper harvesting techniques
Treatment	Technology dissemination on post harvest treatment of fruits	Technology dissemination on post harvest treatment of fruits; provide water treatment machine	Technology dissemination on post harvest treatment of fruits
Classifying	Information dissemination on classes and prices		Classifying (Escoje) services
Hauling			Hauling services
Warehousing			Warehousing services
Buying			Buying
Processing			Technology dissemination on processing, processing
Marketing	Information dissemination on prices		Information dissemination on prices

Field Days and Agricultural Fairs. The local government in cooperation with the many agencies present in Ubay had launched an Agripark, a kind of integrated showcase facility located inside the Ubay Stock Farm compound (See Table 34). The facility was used also as a venue for agricultural fairs which included rodeo competitions and horse racing at least once a year. During the town fiesta, which happened every last Saturday and Sunday of January, the local government tasked the OMA to organize an Agriculture Fair in the town plaza. In these fairs, farmers' associations were asked to exhibit farm products. Horticultural groups were also invited to exhibit their products. These exhibits normally started days before the actual fiesta in order to allow exhibitors more time to sell and display their products. In certain cases, the BES also conducted field days but they generally invited farmers and agriculture staff throughout the province and not just from Ubay.

Logistics and Other Operational Supports

Facilities and Equipment. The OMA had modest offices and few equipment. Their office building was an old separate structure with office space, kitchen, lavatory and a bedroom. It had office tables, chairs and cabinets. It had one computer and telephone. It had no official vehicle. The OMA, also had a breeding station at the Agripark, a nursery at the back of its office where they grew mango seedlings and asexually propagated them for sale. It also had an incubator. Technical materials were posted on the walls but there was little of technical resource library or something like a data bank. Old publications and reports were also available on display.

Transportation and Staff Mobility. The field extension staff, at least those who had motorcycles were given fuel allowance of at least eight liters of gasoline per week²⁶ allowing them to move around the field more easily. It must

²⁶ The amount had since been reduced to 5 liters. This is another example of how a local government tries to provide support to its field personnel. Strictly speaking, government funds for gasoline or government purchased gasoline cannot be used to fuel private vehicles. Many

be pointed out that most of the field staff gravitated around the rice areas only. The fishery staff along the coastal areas only. The livestock technologist served the whole town, but field visits were also contingent on calls for assistance. In addition, the MAO, thinking about the limitations in terms of compensation and lack of other allowances for the temporary staff (casual) decided not to assign them to the field unless they were part of teams that went to the barangays for specific purposes. Therefore, these staff were generally based in the office. There were no official vehicles assigned to the OMA. Those without vehicles took public transportation.

Linkages

The LGU cannot stand alone in dealing with the multifarious problems of the agriculture sector. It had to establish working relationships with various providers of services from other government agencies and private organizations (Non-government organizations (NGOs) and businesses. Table 37 shows some of the partner agencies and NGOs that the OMA had established cooperation over the years. These linkages were in the form of resource sharing, information, joint activities, training, monitoring and report sharing. Very close linkages were maintained with the DA family, the provincial offices of Agriculturist and Veterinarian and all other agencies that were based in Ubay through the Ubay Agripark where most of these agencies maintained ecological farming demonstration (ecodemo) sites.

Financing

Budget for Agriculture. Based on figures obtained from the records of the LGU, it can be seen that appropriations for agriculture had been steady for

Table 37. Agencies and organizations linked with the OMA.

Agency/	Project /Activity	Role of partner	Role of LGU	Freq.	of
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agencies and LGUs had used this prohibition to deny gasoline support allowance to their extension staff. Ubay had been very creative in this regard by devising ways to allow the field staff to avail of gasoline for their private vehicles. This allowance had boosted the field staff's mobility.

Organization				cooperation
DA/RFU	Training of staff; National banner programs	Provision of funds Provision of funds/resources	Local transportation; Identification of beneficiaries Monitoring and report submission	Frequent
DA/ATI	Training of staff	Provision of resources	Identification of trainees	Sometimes
DA/APC	Various activities	Resource provision	Coordination	Sometimes
DA/CENVIAR C	Various activities	Resource provision	Coordination	Frequent
DA/BES	Various activities	Resource provision	Coordination	Frequent
DA/USF	Agripark	Maintain ecodemo	Coordination	Frequent
DA/PCC	Agripark	Maintain ecodemo	Coordination	Frequent
OPA	National Banner programs Training of staff	Coordination Provision of resources	Coordination, reporting Transportation and travel	Frequent
OPV	Animal health program	Provision of vaccines	Information dissemination; vaccination	Every six mos.
Philrice	Rice technodemo	Inputs and technology provision	Provision of counterpart funds	Stopped
PCIC	Crop insurance	Insurance coverage, Information campaign	Information campaign, identification of beneficiaries, monitoring	As the need arises
BFAR	Agripark, CRMP	Maintain ecodemo	Coordination	Frequent
NIA	Agripark, irrigation	Maintain ecodemo/ irrigation systems	Coordination	Frequent
DAR	Crop production	Provide resources for training	Coordination	Frequent
DENR	Agripark CRMP	Maintain ecodemo	Coordination	Sometimes
PNP/coast guard	Coastal res. mgt	Conduct patrols Conduct training of Bantay Dagat	Join patrols Coordinate with Bantay Dagat	Frequent
BOFAMCO	Seed production/distribution	Produce seeds	Coordination	Frequent
SeaRice	Organic Rice production	Training of farmers	Undergo training; identify participants	Rare
FISH	CRMP	Technical assistance; funding; capability building; community mobilization	Coordination in implementation	Rare
Fertilizer/Chemical companies	Information dissemination	Conduct training, distribute IEC materials	Coordinate	

the last 12 years after devolution. Slight fluctuations between 3.13 to 4.69 percent could be noted. This low percentage was similar to other LGUs. Real project budgets were indicated in the annual investment plan (AIP) but even the AIP allocations were inconsistent. There were years when the allocation was less than 2 percent of the total AIP and there was a year when it reached 10 percent. In the 12-year period there were no AIP allocations for agriculture for five years. The AIP is 20 percent of the IRA devoted for development projects and allocation

Table 38. Municipal budget and budget and AIP for Agriculture, 1993 – 2004.

Year	Total Municipal Budget	Budget for Agriculture	% of total budget	20% AIP	AIP for Agriculture	% to total AIP
1993	14,233,207.48	518,111.56	3.64	2,206,261.40	176,280.00	7.99
1994	16,448,088.30	597,352.54	3.63	2,921,825.00	301,825.00	10.33
1995	19,891,099.76	673,052.64	3.38	2,895,672.00	50,000.00	1.727
1996	20,059,549.29	941,093.16	4.69	3,577,230.60	150,000.00	4.193
1997	22,188,528.22	831,103.00	3.75	3,542,520.00	0	0
1998	26,851,527.00	1,046,515.00	3.90	4,560,981.60	0	0
1999	30,301,214.00	1,363,208.40	4.50	4,738,941.20	0	0
2000	37,806,462.80	1,184,559.20	3.13	6,091,574.40	195,000.00	3.201
2001	47,027,165.70	1,656,563.60	3.52	7,089,112.94	0	0
2002	45,114,194.26	1,721,414.80	3.82	7,333,234.78	100,000.00	1.364
2003	52,473,913.41	2,090,806.80	3.98	381,532.00	381,532.00	100
2004	54,000,000.00	2,082,201.60	3.86	9,800,000.00	0	0

Table 39. Additional municipal appropriations for agriculture, 1993-2004.

Year	AIP for Agriculture	Supplemental Appropriation for Agriculture	Total appropriation for Agriculture
1993	176,280.00	0	176,280.00
1994	301,825.00	0	301,825.00
1995	50,000.00	30,000.00	80,000.00
1996	150,000.00	83,380.00	233,380.00
1997	0	0	0.00
1998	0	0	0.00
1999	0	0	0.00
2000	195,000.00	400,000.00	595,000.00
2001	0	300,000.00	300,000.00
2002	100,000.00	0	100,000.00
2003	381,532.00	23,468.00	405,000.00
2004	0	0	0

depends on proposals made by department heads and subject to approval by the local legislative council. Nevertheless, there were also years when supplemental allocations for agriculture were obtained as shown in Tables 38 & 39.

Allocation by Item of Expenditure. As far as specific allocations for each budgetary item for the OMA was concerned, most was allocated for salaries. More than 90 percent of the amounts were consumed by wages and salaries. Very little was left for operations and maintenance explaining the lack of substantive activities in the field. Notice also that there are items that are very broad such as the one on Coastal Resource Management Program. Other items were very specific but these items looked like they were likely to be distributed such as seeds. It must be noted that capital outlay is not always allocated every year. Real MOE expenses such as travel, supplies, communication and training constituted only P185,000.00 pesos which was only about 11.84 percent of the annual budget (Table 40).

Table 40. Municipal appropriation for agriculture for 2004.

Object of Expenditure	Total Authorized Appropriation	Percent
Total Personnel Services	1,562,201.60	75.03
MOOE		
Travelling Expenses	50,000.00	2.40
Communication Services	10,000.00	0.48
R/M of G/F	25,000.00	1.20
Supplies & materials	50,000.00	2.40
Vegetables seeds & ubi seeds pieces	25,000.00	1.20
Feeds & medicines	60,000.00	2.88
Coastal Resource Mgt. Program	50,000.00	2.40
Training & Seminar Expenses	75,000.00	3.60
Subtotal	345,000.00	16.57
CAPITAL OUTLAY		0.00
Construction of fish sanctuary	100,000.00	4.80
Improvements of Echo Farm at Agripark	50,000.00	2.40
Installation of Telephone (DOTC)	10,000.00	0.48
Incubator	15,000.00	0.72
Subtotal	175,000.00	8.40
Grand total	2,082,201.6	100.00
Assessment of Agricultural Services		

Various providers offered a wide array of services to local farmers. However, a major question is the intensity and adequacy as well as timeliness of these services. The national agencies found in Ubay, understandably provided minimal direct service to local farmers. Some of these agencies were not essentially extension service providers per se but extension was only a part of their overall functions and they also served clients outside of Ubay.

These agencies did not have adequate staff to perform extension services, hence, any extension service were limited to occasional rather than sustained regular activities. The private companies, however, were very active in selling their technologies to the farmers so that one local extension staff expressed his dismay over their competition. He complained that they would eventually lose to these salesmen because they did intensive selling so that even their campaign on integrated pest management and pesticide safety became futile against the onslaught of aggressive advertising.

Quality of services may be gauged according to five major criteria namely accuracy, adequacy, timeliness, relevance and equity.

Accuracy. The accuracy of the services provided by public and private providers could only be said to be partial. The major question here is whether the extension service, especially the local extension service had pinpointed the kind of service it can provide effectively and efficiently. In general, farmers took the advice of extension staff and generally found them accurate. In some instances, however, these advices had been less accurate. The accuracy of advice, however, would depend on the accuracy of data available and information obtained by the field extension staff. Reports of crop failures indicated that the advice might not have been accurate.

Adequacy. The services were obviously inadequate to meet the needs of the clients. In Ubay, ATs claimed that each of them covered, on the average 11 barangays. The livestock and HVCC people covered all 44 barangays. The

fishery staff served all coastal barangays (21). Due to the large number of clients, it was impossible to serve all the clientele. Furthermore, services were limited as to type. In many cases, technical advisory services, training services and facilitating services were provided by the extension staff. Many farmers felt that advisory services were not enough because they felt that material help was also important. In this regard, material assistance was even more inadequate. Subsidized seeds, fertilizers and pesticides were grossly inadequate to meet the needs of the rice farmers. Irrigation water was inadequate. Technical advisory services in other commodities were more wanting such as those in mango where there was no local staff expertise. For other commodities such as rootcrops and other minor crops, the staff acknowledged that their services were very limited.

Service provision was definitely limited by the number of service personnel available. All in all, the limited budget for agriculture, limited number of staff, limited facilities and other resources of the local extension service contributed to the inadequacy of the extension services.

Timeliness. The timeliness of local extension services was conditioned by the need of the farmer, the availability of the technology or personnel needed, and availability of transportation and communication facilities. In general, extension services were provided regularly by the field staff and most of the farmers' needs were given attention immediately. Appointments were kept and unscheduled office calls were attended to with the utmost dispatch. In some cases, because of bureaucratic limitations, material assistance came late. If the need was urgent, it was the policy of the office to mobilize all available personnel to complete a task.

Relevance. Most of the services provided to local farmers were deemed relevant but there seemed to be a lopsided focus on rice. This is understandable considering that the main crop in the area was rice. Even in rice, the most important problems reported were capital and irrigation water especially in

rainfed areas, which could not be solved or provided by the local extension service. Therefore, the local extension staff may have to perform facilitative services to help farmers access cheaper capital because capital, per se was readily available from informal sources but was expensive through high interest rates. There may also have to be a serious search for alternative rice-based cropping systems for rainfed and upland areas because the majority of the farm areas in Ubay were not irrigated.

Equity. It must be pointed out at the outset that due to the commodity focus of extension service, there were already inherent inequities in the system. Even in the much served rice subsector, focus was perennially limited to the irrigated rice areas. Other subsectors, mostly those commodities not considered important were grossly neglected. Even the mango subsector, which had been growing, had not been served adequately by the public sector extension service. In terms of farmer types, it appeared that small and large farmers were served more or less equally although it also appeared that relatively large farmers needed the public extension service less in terms of technical advice because they could afford to access these on their own. In general, most Ubay farmers were small farmers.

Knowledge Management in the Local Extension Service

Agricultural extension has been credited for the rise in productivity of agriculture worldwide. Basically, it is the transfer of research findings to the farmers by various agents using adult education and communication principles. Simply, it is a process of knowledge management in terms of both how knowledge from the source is transformed into usable information and packaged for farmer consumption and how transmitted knowledge is processed and applied to make critical decisions in farm operations. Two major aspects of extension are therefore crucial. One is the transfer of relevant knowledge from various sources

to the end-users (farmers, fisherfolks) and the other is the development of capacity by users to use this knowledge.

For extension, a good analytical framework to use is the Knowledge Management Framework since extension is basically a knowledge transmission system. The framework allows an analysis of how knowledge can be managed in order to maximize the impacts of extension. It allows an analysis of how knowledge assets are used by the system and how best practices can be maximized. The most intriguing question, however, is how explicit knowledge becomes tacit knowledge and how tacit knowledge is captured and transmitted. Being able to answer these questions means that the extension service should transform itself in order for this to happen.

The knowledge management framework is a useful perspective in looking at the operations of extension in the field in order to see how the processes of knowledge transfer and use result to higher productivity and income of the farmers, the ultimate goal of extension. The framework tries to look at various aspects of knowledge management specifically people, culture, strategies and processes and technologies.

What is knowledge Management?

“Knowledge management or KM is the deliberate and systematic coordination of an organization’s people, technology, processes and organizational structure in order to add value through reuse and innovation. This coordination is achieved through creating, sharing and applying knowledge as well as through feeding the valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning”²⁷ it is also how “...Information is turned into actionable knowledge and made available effortlessly in a usable form to the people who can apply it”²⁸ “enabling efficient and effective decision making in their everyday business.”²⁹

²⁷ Dalkir, Kimiz, Knowledge Management in Theory and Practice, Boston: Elsevier, Inc.. p. 3.

²⁸ Ibid, Citing Information Week, Sept. 1, 2003.

²⁹ Ibid, Citing Steve Ward, Northrop Grumman,
<http://www.destinationkm.com/articles/default.asp?ArticleID=949>.

Applied to extension, KM means the extension service as an organization must look for information, turn this into actionable knowledge and make these available to farmers to enable them to make decisions in their daily work. It must tailor its organization, coordinate its people, streamline its processes and use available technologies to achieve adoption, reuse, add value and innovation among its clients.

The Knowledge Management Cycle

Using Dalkir's' summary of the KM cycle, there are three major steps in the KM cycle: knowledge capture and/or creation, knowledge sharing and dissemination and knowledge acquisition and application (Fig. 16). There are two types of knowledge. Explicit knowledge and tacit knowledge. The former is knowledge that has been codified and can be readily obtained from various sources such as books, articles, electronic forms or by attending seminars or listening to lectures. Tacit knowledge is more valuable knowledge. It cannot be easily represented, hence, is difficult to codify. From this, we can look at how the local extension service and the farmers capture, disseminate and utilize knowledge.

Knowledge Capture/Creation

This is either capturing existing knowledge or creating new knowledge.³⁰ This is the transfer and transformation of valuable expertise from a knowledge source to a knowledge repository. This involves reducing a vast volume of content from diverse domains into a precise, easily usable set of facts and rules. Explicit knowledge is already there and the need is to abstract or summarize these. Tacit knowledge is difficult to codify, hence, needs to be analyzed and organized before it can be described and represented.³¹

³⁰ Ibid. p. 78.

³¹ Ibid. p. 82.

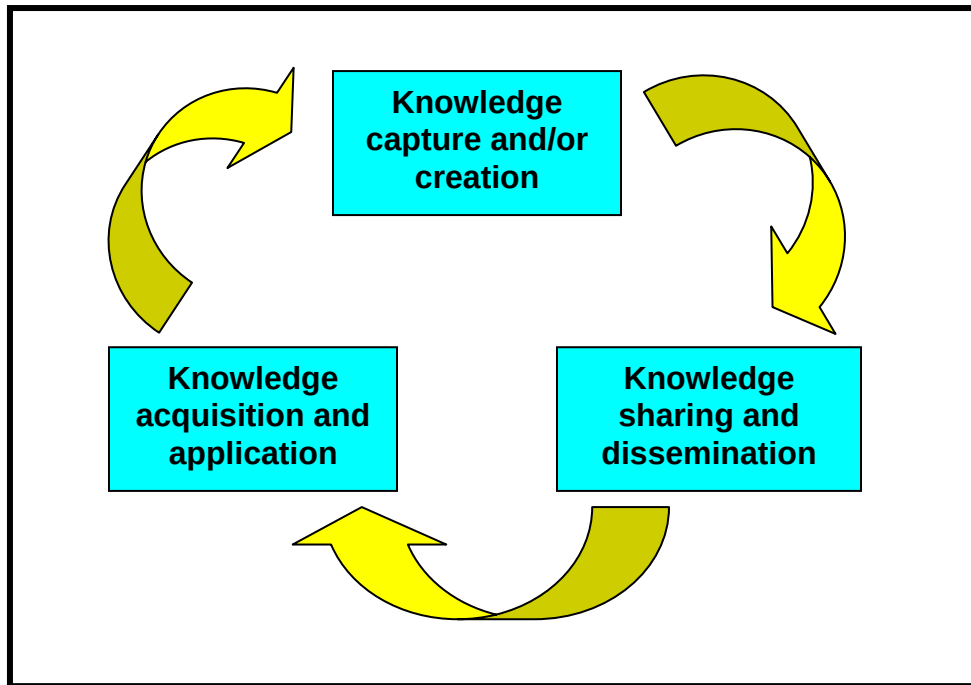


Fig. 15. The Knowledge Management cycle³²

Individuals and organizations will have to capture knowledge. Organizational memory includes the experience of its members combined with tangible data stores in the organization.³³ It must therefore be a part of the organizational culture, program and processes to capture knowledge so it becomes part of the organizational knowledge base.

The municipal extension service was very dependent on knowledge shared by government sources through the Department of Agriculture. Years ago, knowledge was captured mainly through trainings that were conducted for the field extension staff. In addition, printed materials were also handed out to them. Other sources could be tapped but depended on the initiative of individual field extension worker. While individual staff may have stored this knowledge in his own head, or sometimes in his personal notes or files of printed materials, there seemed to be no organizational policy and process to store these in a database electronic or otherwise to make them available to every member of the organization. Individual staff took notes on certain matters but it appeared that

³² From Dalkir, p.

even explicit knowledge was not recorded in a systematic manner that was easy to retrieve and use by others. In mango, for example, it appeared that there was no attempt to capture explicit or tacit knowledge officially.

The local extension service staff had very limited resources to capture knowledge although they had many sources (See Fig. 17). First, the number of trainings conducted in order to upgrade their technological knowledge had been nil and sporadic at best. In terms of explicit knowledge in print and other media, the sources and opportunities were also few. Moreover, they did not access knowledge from internet sources. At best, those who had been practitioners relied on their tacit knowledge, especially on rice production so that combined with explicit knowledge gained from other sources, they shared these to their clients.

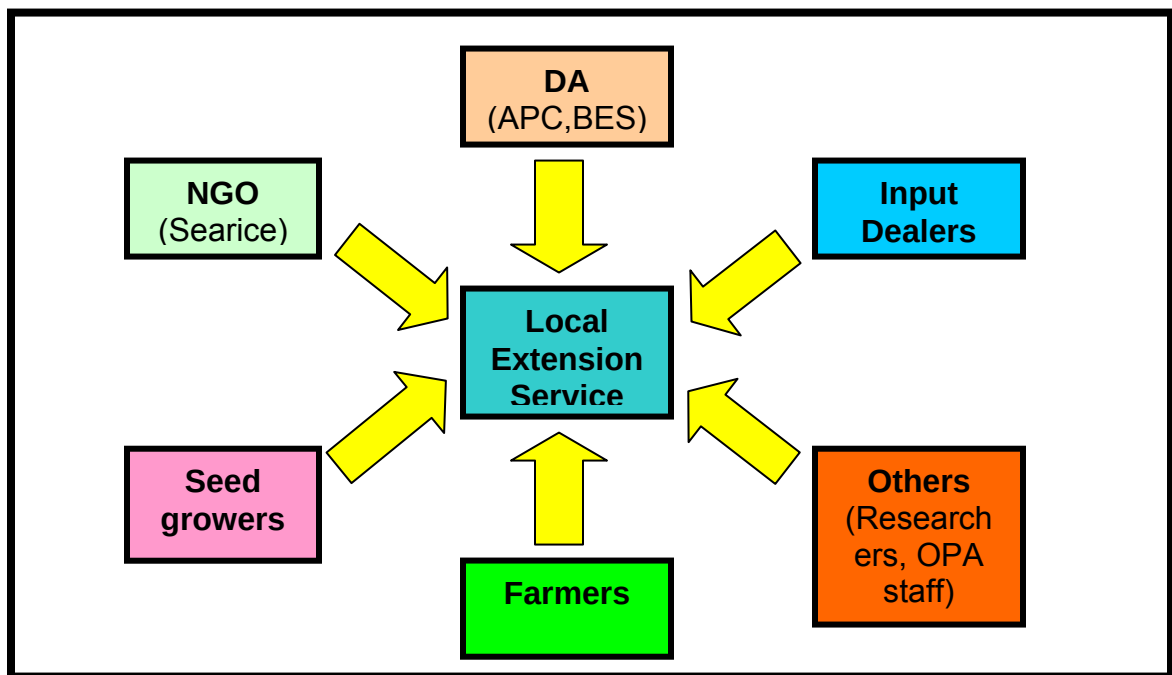


Fig. 16. Sources of knowledge (rice) of the local extension service staff

Best Practice. How best practices evolve among different farmers may have taken several turns and at different paces but the steps may be generalized into four major categories. First, it starts with a good idea. A farmer through his

³³ Ibid.

own initiative or learning from others conceives and idea which he may deem good. This idea is yet untested and must be studied. Then he uses it successfully in his farm. The same idea is used by other farmers. Experts recognize this idea as the best in the locality. This idea becomes available for reuse. Finally, this local best practice may be recognized by outside experts to be the best in the industry. The following diagram is instructive:³⁴

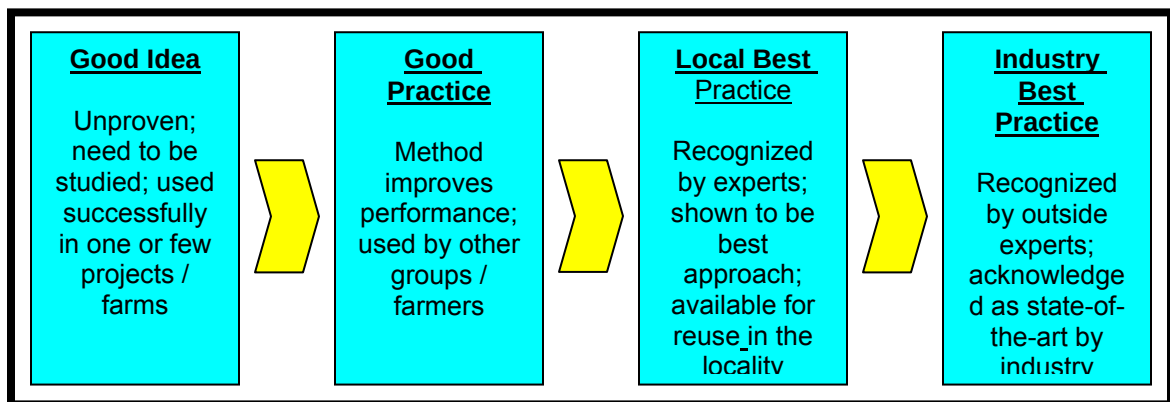


Fig. 17. The evolution of best practice

A good source of explicit and tacit knowledge, especially for resource-poor organizations such as the local extension service were good or best practitioner local farmers. These best practitioners are knowledge sources or assets. In Ubay, certain rice farmers reportedly obtained yields of as high as 9 or 12 tons, a rare accomplishment since most farmers yielded only more or less 3 tons per hectare. Among mango planters and contractors, some could be considered veteran practitioners and were willing to share their knowledge. The extension service must be quick to capture the knowledge of these best practice farmers because of their direct relevance to the other farmers in the area for the reason that their practices were tested under local conditions. Therefore, these practices were proof that under similar conditions, other farmers could obtain similar yields. Now one strategy is to capture explicit knowledge through interviews and field visits to their farms. Tacit knowledge may be captured through more intensive

³⁴ Adapted from Dalkir, citing another source, Ibid. p.130.

observations and interviews. This knowledge, along with those obtained from other sources must be recorded and transformed into readily usable procedures and stored in a knowledge repository, at most either in a document stored as a hard copy or in the single office computer. As of this writing, there has not been an attempt to capture knowledge in a systematic manner even from local sources. There had been attempts to capture knowledge from outside sources but in a sporadic unorganized manner but there was no evidence that these were codified, stored and made available to the members of the organization. There had been no policy, process or technology to allow such to happen.

The most likely criterion for identifying best practice would be productivity. Farmers reporting highest yields in the area could be identified easily. But if the criteria involve sustainable practices, then yield does not suffice. In Ubay, where agronomic conditions may be limited and farm sizes relatively small, the criteria may involve diversification, conservation practices, productivity and profitability. It might be mentioned that even in lowland areas, rice may not be the most profitable crop. So the local extension service, collaborating with local farmers, knowing what is worth promoting may formulate its own set of criteria for best practices, have these tried or verified by other farmers to prove if these improve overall farm performance. The task of the extension service is to record these experiences and put these into a repository where others may share.

Knowledge Assets

Jun. Jun is a young farmer whose formal training was in fishery. He was married to a pastor and they run the small local church in a village in Ubay where they are based. Jun was introduced to farming when he administered a relatively large estate for an absentee landowner. He claimed it took him three consecutive years, mostly failures but instructive to master rice production. He has then engaged in commercial rice production and rice seed production. He said that by now he knows the intricate processes in the production of hybrid seeds. Jun shares willingly his knowledge about rice production and says that he provides all information to buyers of his seeds and anybody who asks for his assistance. He has ventured into diversified farming planting vegetables around his extensive farm. Jun combines his farming with his church duties and blends well with other farmers in and around his place of residence. Jun being educated and naturally curious does not rely on existing knowledge but tries to learn new things from his own farm at every opportunity. He continues to experiment in new things. He is a knowledge asset that should be tapped by the local extension service.

Lando (Labitad). Lando is planter contractor. An unassuming man, relatively young and a native of Cebu. He said he grew up in a mango farm in a mango growing family. Lando drifted to Bohol rather in a roundabout way. During the height of the insurgency he found himself caught up in the tumult that crept into their once peaceful existence. Becoming a fugitive, he finally availed of the NRDP and was one of the beneficiaries resettled in Tuburan through the Bayanihan settlement project. Lando knew and loved no other crop except mango. Having been born under hundred year old mango trees he talked and breathed mango. His grandparents, parents and siblings were into the mango industry in Guadalupe Cebu. Lando knows everything about mangoes but is too modest to claim that no matter how good one is about anything, there are factors beyond his control that may result to crop failure. He claims Ubay is a very good site for mangoes especially in those areas near the sea. It was his observation that mangoes grow well near the sea. He has mastered the production process, the inputs needed and some "secrets" to outsmart the pests and his competitors. He knows small things like how to produce those tiny bamboo skewers that they use to lock the wrappings of the individual fruits to protect them from pests. He knows the existence of an insect—an ant-like insect he calls "pila" that preys on other insects that attack the fruits. He has proposed some way to keep them by keeping a stock of grated coconut and sugar so that they would not go away or secured from damage when spraying. He insists that for those who are allergic to mangoes, one should not eat the part near the base of the fruit. He is open to his patrons and also openly shares his knowledge to other farmers. He had been elected as a new officer in the revitalized organization of bayanihan (NRDP) farmers. His wife and grown up children help him in his business. He is a very modest man living in a modest house. A man of agreeable temperament and communal spirit, Lando is a knowledge asset.

Knowledge Sharing and Dissemination

Knowledge Sharing the Traditional Way. In Ubay, knowledge sharing was unsystematic and opportunistic. Sources varied according to access. Each user accessed whatever he/she needed from sources within his/her reach (Fig. 18). It will be no surprise to know that certain members of the organization had more knowledge about a specific subject than others even if they were supposed

to work on the same commodity. Basically, their knowledge base was inadequate, hence, the knowledge that they shared to their clients was also inadequate. Participants in the exchanges, since these were unorganized, did not have full and consistent contact and since no discernible outputs of the exchanges were recorded, the exchanges were ineffective. Take rice technology. It appeared that not all members of the organization had the same level of knowledge about certain varieties of rice because some aspects of the technology were not captured at all. For example, a variety was introduced but they failed to know that such a variety was susceptible to a certain disease thus causing farmer adoptors to be unprepared for the occurrence of such and it did occur leading to crop failures of as many as two times in succession.

The lack of records of knowledge captured and shared probably explains distortions on nomenclatures, procedures and processes. A specific example is how varieties within a locality take on different names as exchanges are made without recording their exact names.

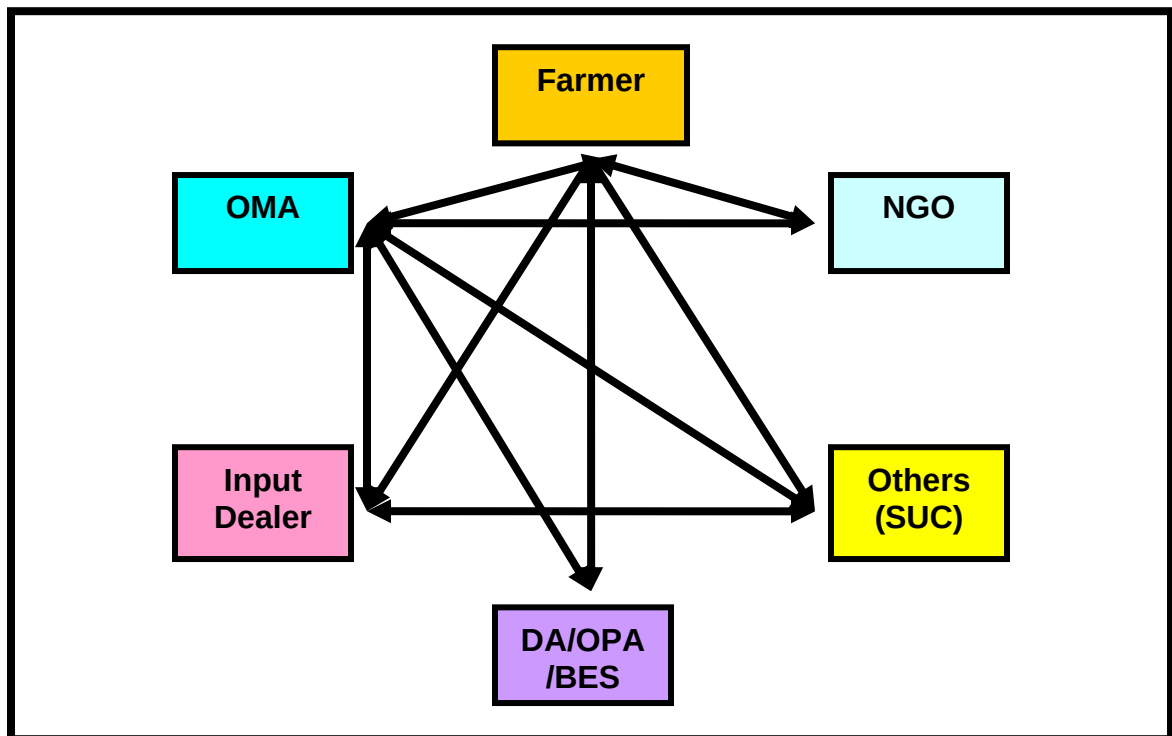


Fig. 18. The existing knowledge sharing process

A difficulty in sharing and disseminating knowledge was the lack of a system of codifying and storing them. Moreover, there was no clear policy and process of sharing even when there was a genuine interest and opportunity to share. Even the echo seminars, which were used as a mechanism to share knowledge gained in seminars among the staff were never done. In addition, the staff was sometimes confused as to what to share. For example, they obtained mostly chemical farming technologies from government sources but they also obtained sustainable farming technologies from both government and non-government sources. They were worried that farmers would be confused too.

Taking off from the best practice strategy, best practices captured must be shared in a systematic manner through farmers' meetings, trainings, field days and testimonies. Furthermore, best practice farmers may be transformed into Farmer-Scientists under the TechnoGabay Program which was present in Ubay. The office should make it a policy and must set up processes including a reward system to motivate these farmers to share their knowledge.

Communities of Practice (CoPs). A strategy to build communities of best practice among farmers and other industry players with the local extension service playing an active role in these CoPs (Fig. 19) may be in order. There were already discernible CoPs that existed where they exchanged knowledge mostly verbally, face-to-face among extension workers, farmers, private service providers and other government sources. It must be noted though, that there seemed to be no systematic recording of the knowledge exchanged and the most that could be said is that these were noted mostly mentally. Nor was there an attempt to record best practices even when practitioners of such were known. Years ago, government extension workers were trained to use farmers to teach other farmers and these was premised on the idea of farmer leaders who demonstrated best practices. This never took hold as a methodology in the local extension service and even in the case of Ubay which had a TechnoGabay program which included among the package a Farmer Scientist component

designed to identify, train and maintain a corps of volunteers who were willing to share their knowledge to other farmers.

Real CoPs are characterized by three common characteristics: 1. members have a common goal which binds them together; 2. mutual engagement, which explains why a member wants to join and perform certain roles for the community; and 3. a shared repertoire or workspace where members can share through discussions and interactions that leave tangible archives which is the social capital of the community.³⁵ Members of the community are expected to help one another and the community is expected to be self-regulating. The extension service being the sponsor of such a community shall act as the CoP **facilitator** who shall be the chief organizer of events, clarifying communications and make sure that everyone participates. It could also serve as knowledge integrator coordinating with other CoPs and makes sure that duplications are avoided and facilitates requests for help. The **Practice leader** could be one of the best practice farmers who will serve as coach to other members, provide thought leadership and validate innovations and best practices. All **members** are expected to promote the CoP, generate enthusiasm and demonstrate its value.³⁶ The CoP may have more complicated structures but the above may suffice for simpler and resource poor organizations.

This strategy would fit nicely to the transmission of tacit knowledge which these best practice farmers are likely to demonstrate. These farmers are some of the knowledge assets in the locality and the added feature is that they had adapted their knowledge to the local conditions. A good way this tacit knowledge can be transmitted is through demonstration since this is rarely recorded in any form by the practitioners themselves or by their peers but may be learned by observation. Moreover, learning tacit knowledge is a social process which requires group interaction.³⁷

³⁵ Dalkir, pp. 123-124.

³⁶ Ibid, pp. 126-127.

³⁷ Ibid. p. 80.

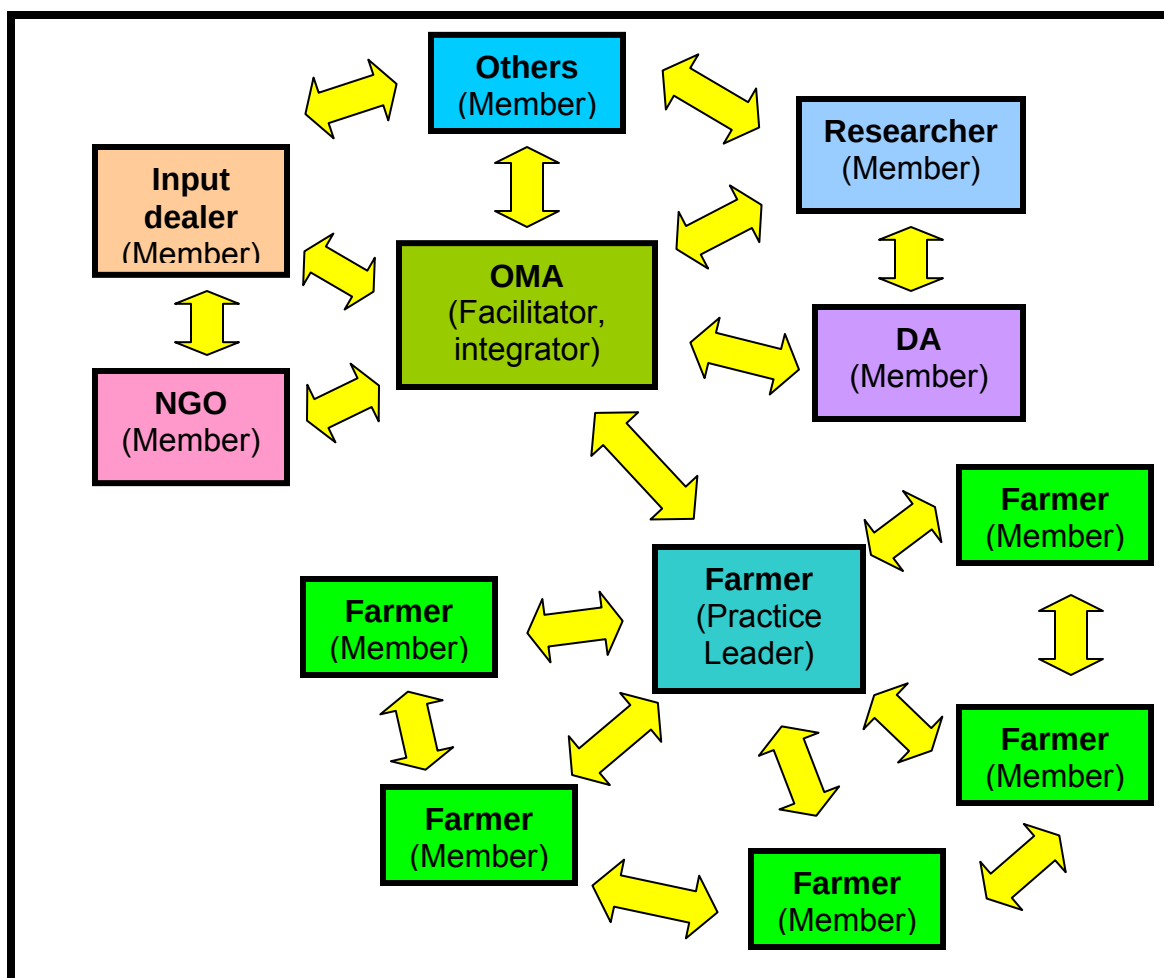


Fig. 19. A knowledge sharing scheme using local knowledge assets (Best practice farmers) through CoPs facilitated by the OMA

In Ubay, the variations in conditions for growing rice were many--“lansub,” “sinaka,” sandy, saline to name a few. These variations call for separate cultural management practices and it is the job of the extension service to provide guidance to local farmers by making them aware of best practices on cultural management already suited to the conditions of their area if they were not already aware of these through a CoP.

Communities of Practice in Mango. In the “convoluted” mango industry the local extension service not having any respectable expertise in mango may choose to participate in a CoP functioning as a facilitator and integrator. This was

already done to some extent by the office but in a very limited unsystematic way. It can enhance its role by consciously capturing knowledge and storing it in a repository and sharing it through a CoP. It is worth mentioning that some local players in the industry use the internet as a source of information and there are numerous local knowledge assets that can enhance the value of such a CoP.

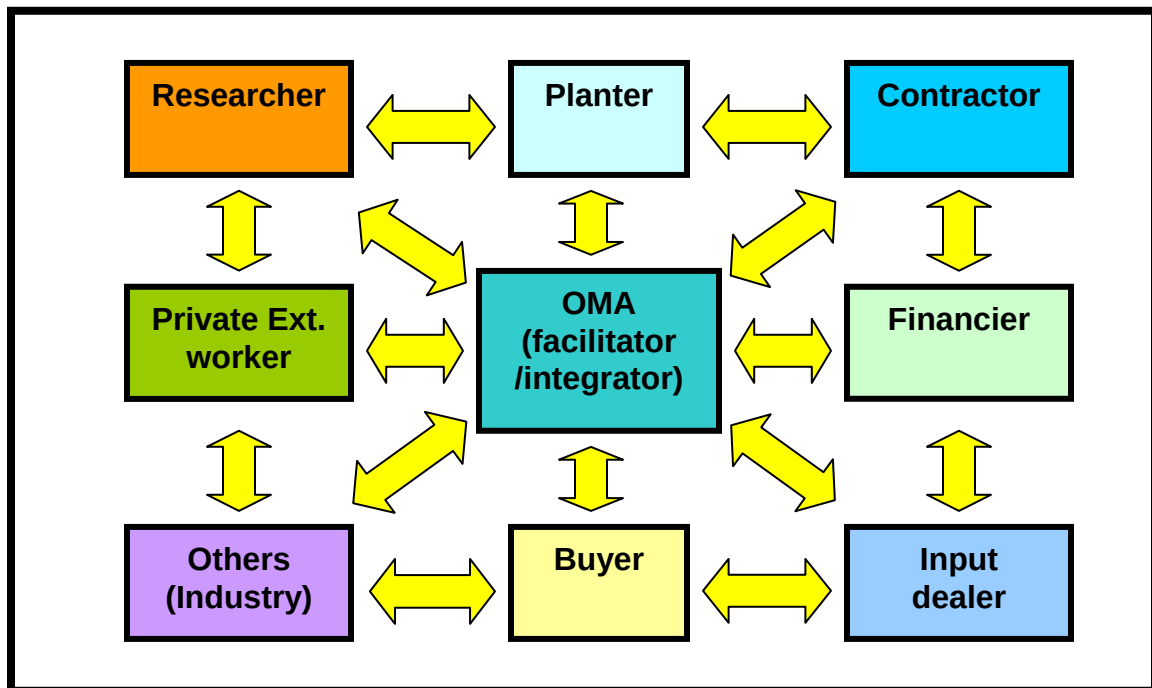


Fig. 20. An idealized role of the OMA in a CoP for mango

The benefits of sharing knowledge through a CoP are that it connects best practitioners, practices are standardized and mistakes are avoided to name a few.³⁸ The implications of knowledge sharing are as follows: 1. that management should provide a climate and culture of networking; 2. travel must be supported and time should be provided for sharing; and 3. knowledge sharing performance should be included in the performance review.³⁹

³⁸ Dalkir, pp. 137-138.

³⁹ Dalkir, p. 139.

Knowledge Application

The test of the usefulness of a knowledge management system is knowledge application. This is not simply having users use knowledge but on the part of the extension service as facilitator and integrator, it is important that it is able to understand which knowledge is useful to which group of clients and how best to make it available to them. Furthermore, the more crucial task, as any extension worker may have already known is making the user decide to use it because it proves to be an improvement of his usual practice. In highly technology-mediated KM systems, several tools had been recommended to facilitate decision-making. For a poorly equipped KM system such as one administered by the local extension service, a basic requirement, at least, is that knowledge is codified and stored in a repository which can readily be accessed by members of the organization or network. The most likely that the local extension service could do is reduce these mostly explicit knowledge into simple manuals that farmers can understand easily. Tacit knowledge that may reside among best practice farmers could be shared through various strategies such as on-site trainings, field days and informal interactions with them. It had been asserted that even in highly technology-mediated systems, the value of person-to-person interaction is very high considering that tacit knowledge is difficult to put into record. It is necessary, therefore, that these farmers be identified, supported, recognized and documented.

Recognizing that tacit knowledge is the more important kind, the extension service must be reminded that it involves more than the cognitive. In fact, ordinary farmers had observed that high performers stand out for their personal characteristics, attitudes and values, specifically, industry and the lack of vices. In a group interview of local farmers about the major issues affecting agriculture, it was concluded that while there were extraneous factors that affected farming, so much still depended on the farmer himself and basically his attitude and industry. It is useful, then to learn Bloom's taxonomy of learning objectives.⁴⁰ Farmers may only be at the lower level of learning such as awareness and

comprehension but fail to analyze, synthesize and evaluate. This could have been a result of the highly top-down approach to extension where knowledge was handed down to farmers and all they had to do was follow without question. The bigger task of extension is to make farmers able to understand, analyze and evaluate to make their own decisions. Of course, decisions will have to be made depending on how much value the farmer attaches to a particular object. He must be able to prioritize these values, synthesize these to form a unique value system that controls his behavior.⁴¹ This value system then becomes pervasive, consistent, predictable and characteristic of the individual⁴² such as the best practitioners.

Organizational Culture

Knowledge Management thrives under an organizational culture that encourages and nurtures the search for new knowledge, stores these systematically and shares these so that these could be used in an effort to achieve efficiency. Dalkir classified organizational cultures into four types: 1. communal culture—task-driven but gives a sense of belongingness to its members. It has inspirational leaders. The disadvantage is that these leaders exert too much influence and other members rarely voice out their opinions; b. networked culture—members are close and are treated as family. They are willing to help each other and share information. The disadvantage is that people are too close they are reluctant to point out poor performance; c. mercenary culture—goal oriented and members are expected to meet goals quickly. The major disadvantage is that poor performers may be treated inhumanely; 4. fragmented culture – the sense of belonging is weak. There is lack of cooperation.⁴³ In the case of the Ubay Municipal Agriculture Office, the organization could be described as having a networked culture. Members were

⁴⁰ Cited in Dalkir, pp. 153-157.

⁴¹ Ibid. p. 155.

⁴² Ibid.

⁴³ Ibid. pp. 181-182.

close to each other, treated as family and there was willingness to help and share.

There were major flaws in the organizational culture of the local extension service in that while there was an openness and willingness to gain new knowledge, there were basic knowledge deficiencies such as the lack of shared knowledge on the vision and mission of the organization, a common knowledge on local conditions (situational analysis), the lack of knowledge and skills on how to gather, store and analyze data and how to incorporate these data into a plan, and how should planning proceed so that the major stakeholders are able to input into this plan. There seemed to be little appreciation of the importance and potential to extension of knowledge assets and nurturing communities of practice even as they already existed in some form. There was a basic lack of encoded knowledge on production technologies for various crops. Sadly, the technical support components—computers, storage and retrieval systems, and expertise to put these into a digital format was also absent. Putting records into electronic files even in the presence of a computer and staff who could have inputted these was not a standard practice. No wonder, data also varied without explanation because there was no system to gather, verify and store.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS
Implications for Knowledge Management in a Localized, Low- resource
Extension Delivery System

Conclusions

Ubay had great potentials for agricultural productivity because of the amenability of its soil and topography to agricultural production and the presence of various programs implemented in the locality especially the expansion of irrigation systems and the improvement of other infrastructure. However, the small farm sizes and high seasonality of production made income from farming inadequate for many farmers and there was a seeming lack of opportunities to earn additional income from off-farm sources due to the absence of non-agricultural enterprises and the seeming excess labor supply. Its farmers were generally small farmers cultivating mostly upland farms. The population was generally poor putting Ubay in the poorer half among a ranking of towns in Bohol.

The town had a small agricultural extension organization despite its relatively large size. While there was high moral support to the OMA by the local elected authorities, the resource limitations of the local government necessitated that meager budgets were allocated to all services especially agricultural extension. It becomes more important, then, that the meager resources be put to good use so that farm productivity and incomes can be achieved by the farmers. Some of the salient problems in the provision of extension services are as follows:

1. Absence of a well-thought out plan for agricultural development of the town. Such a plan should be shared by all stakeholders especially the staff of the extension service organization.
2. The lack of a system of technology sourcing, archiving and sharing so that clients who were mostly of lower education could comprehend and use them for decision-making.
3. The inadequacy of support services especially low-cost credit to allow small farmers to capitalize their farm enterprises, marketing assistance so that

farmers get better returns on their produce and location-specific technologies adapted to rainfed farming systems to allow farmers the best use of their land.

4. Due to the small organization and high population to be served, the inadequacy of extension services and the lack of effective strategies and facilities to promote knowledge capture, sharing and application hampered the widespread adoption of productivity-enhancing technologies.

Recommendations: Shifting to a Knowledge Management Paradigm in Extension

Agricultural extension is a knowledge-based activity and farmers and extension workers must be seen as knowledge workers who must depend on knowledge for their productivity. Presently agricultural extension workers and farmers still seemed to believe that knowledge resided only in the extension service and it was its job to transmit these to farmers. Considering the many demands on the extension workers and the small size of the extension service organization, it might be useful to shift to a more effective strategy using the Knowledge Management Framework. This shift entails the following:

1. Preparing the organization for KM and creating a culture for KM. This means that the organization and its members as well as the farmers shall be made aware of organizational change. This also entails a shift in the concept of the agricultural extension system which treats farmers as external to the organization because they are viewed as clients. The farmers are internal to the system which means they are part of the whole KM cycle creating and capturing knowledge, sharing and applying these. Everybody in the system then is considered a knowledge worker whose business it is to capture, organize and summarize this knowledge to make daily decisions. A training of the staff and farmers on KM is necessary. It is important, as suggested by Dalkir, that cultural change is needed to set norms that promote a culture of KM. Citing Gruber and Duxbury, he enumerated the characteristics of a favourable environment as follows: a. a reward structure that recognizes knowledge sharing with peers; b. openness, no hidden agendas; c. communication and coordination between

groups; d. trust; and, e. top management support.⁴⁴ This means that the organization should provide incentives not only for knowledge sharing but knowledge capture as well. Communication and coordination with all possible collaborators should be systematic and frequent and initiatives should be supported by the LGU.

2. Adopting KM as a framework for extension. The staff must accept the new framework as a viable strategy. This can be done by formulating a policy adopting the strategy through a resolution by the local legislative body to give legal mandate to the shift.

3. Training the staff on skills on knowledge capture, encoding, sharing, organizing communities of practice and knowledge application. This could include basic data gathering, record keeping, data analysis, computer literacy, use of internet, etc.

4. Establishing a knowledge repository in the agriculture office. Since limited electronic facilities are available, this repository can be simplified into anecdotal accounts of technologies, practices, reports and other documents in written and electronic form. The staff should reduce the vast array of materials into simplified set of procedures that farmers could understand easily. There must be an archive of the knowledge created or captured. This necessitates that all staff must produce a record of the knowledge that they have created or captured and contribute these to the repository. For example, there should be a list of farmers who yielded 10 tons of rice or higher. A documentation of their farms and cultural management practices should be made. This could be done through interviews with these farmers. In other cases, observations from field trips, field trials and conversations with information sources must be recorded. For example, there should be required written records of the observations made by staff who visited a balut maker in order to learn about the process of balut making, marketing strategies and problems. The organization spent money on staff specifically to learn this and it would be important that this learning is codified, encoded and shared among the staff and more importantly, with

⁴⁴ Ibid. p. 187.

farmers. Additionally, informal trials had been made on the Masipag varieties of rice. To date, no written record of experiences had been made on observations such as on which varieties did better and under what conditions in Ubay; how these varieties performed in other locations; and, how farmers who yielded higher obtained those yields. The basic characteristics of the varieties as observed had not even been recorded on paper.

5. The knowledge deemed useful for specific groups of farmers then shall be shared to other farmers for trial adoption, corroboration and wider application through various means such as farm visits, farmers' meetings, trainings, technodemo, print media and other channels. The network of adoptors shall then comprise a CoP that shall be facilitated by the OMA. The OMA should put into practice the Magsasaka-Siyentista (MS) concept under the TechnoGabay program which was present in Ubay. These farmers should be identified and trained if there were none yet. Best practitioners shall be the major candidates for MS.

6. Since the CoP will be limited in its use of electronic technology, a person-to-person approach shall be adopted. Nevertheless, the role of the internet should not be discounted as OMA may leverage resources to get internet facilities and some farmers may have the same opportunity in their private capacity. In addition, the pervasiveness of the cellphone may provide additional advantage. The CoPs, which shall take the main route for sharing and verification, in order to be sustained must have regular procedures and rules. In what form should exchanges be, how frequent, where should these be made in lieu of an electronic space, how should participation be sustained, what are the rules for joining, etc. The OMA should be able to facilitate the CoP which need not be put up quickly. Methodologies for sharing and evaluating including the use of some assessment tools such as the gross margin profit tool, etc, should also be adapted as the need arises.⁴⁵

⁴⁵ The Continuous Improvement and Innovation (CI&I) approach is replete with tools as it works through CoP type groups.

7. Providing for KM: personnel, equipment, budget. The staffing of the extension office must be rationalized to suit to the demands of the service. Staff will now have to take specialization on major commodities to be able to facilitate the CoPs. Positions may not have to be renamed but they may have to be trained also as subject matter specialists who are able to gather knowledge and reduce this knowledge into usable form by the farmers.

8. The field visits of the staff should be more systematic and organized serving as a regular facilitating and integrating task among CoPs on different crops. The gasoline allowance should be maintained or increased to make field visits more frequent and regular.

9. Additional or new computers should be obtained and at least one should have internet connection to allow the staff to search for more knowledge and reach more knowledge sources. Necessarily, all staff must be trained to use the internet and search and send communication at least through e-mail. Or the staff may be allowed expenses and time for internet use. Consequently, the budget for travel, telephone service, internet, meetings and facilitation of the CoPs will have to be provided.

10. The national government through the DA should adopt a grant system for LGUs willing to shift to KM on an experimental basis for training, equipment and information support. The grant should be based on a proposal specifying the needs and capacities of proponent LGUs.

11. The national government through the BAR, ATI and State Colleges and Universities (SCUs) should provide assistance in linking LGUs to information databases and training them in archiving and assisting them in information packaging. Information packages then should be integrated into the (Farmers' Information and Technology Services (FITS) center.

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Appendix Tables

Appendix Table 1. Current and projected population, Ubay, 2000-2012.

Year	Projected Population
2000	59,827
2001	61,830
2002	63,900
2003	66,039
2004	68,250
2005	70,534
2006	72,896
2007	75,336
2008	77,858
2009	80,465
2010	83,158
2011	85,942
2012	88,819

Source: NCSO

Appendix Table 2. Urban and rural population by barangay, 2000.

Barangay	Population	% to Population	Household Population	% to Total Household Pop.	Number of Household
A. Urban Barangays	13,116	21.92	13,060	21.86	2,446
Urban Center 1					
1. Bood	2,087	3.49	2,075	3.47	395
2. Fatima	2,813	4.70	2,801	4.69	541
3. Poblacion	3,418	5.71	3,386	5.67	636
Urban Center 2					
5. Cuya	468	0.78	468	0.78	83
6. Guintabuan	536	0.90	536	0.90	100
7. Juagdan	1,083	1.81	1,083	1.81	214
8. Tintinan	756	1.26	756	1.27	118
B. Rural Barangays	46,711	78.08	46,691	78.14	9,066
1. Achila	1,102	1.84	1,102	1.84	221
2. Bay-ang	1,536	2.57	1,536	2.57	270
3. Benliw	814	1.36	814	1.36	155
4. Biabas	2,142	3.58	2,139	3.58	470
5. Bongbong	728	1.22	728	1.22	139
6. Buenavista	648	1.08	648	1.08	124
7. Bulilis	1,391	2.33	1,391	2.33	251
8. Cagting	1,866	3.12	1,866	3.12	342
9. Calangaman	1,284	2.15	1,284	2.15	257
10. California	814	1.36	814	1.36	139
11. Camali-an	454	0.76	454	0.76	99
12. Camambugan	2,038	3.41	2,038	3.41	382
13. Casate	1,976	3.30	1,976	3.31	368

14. Gabi	1,186	1.98	1,186	1.98	231
15. Gov. Boyles	944	1.58	944	1.58	190
16. Hambabaoran	854	1.43	854	1.43	158
17. Humayhumay	1,674	2.80	1,674	2.80	300
18. Ilihan	735	1.23	735	1.23	138
19. Imelda	1,850	3.09	1,844	3.09	348
20. Katarungan	1,089	1.82	1,089	1.82	231
21. Lomangog	1,641	2.74	1,641	2.75	341
22. Los Angeles	213	0.36	213	0.36	42
23. Pag-asa	921	1.54	921	1.54	171
24. Pangpang	962	1.61	962	1.61	186
25. San Francisco	1,780	2.98	1,780	2.98	339
26. San Isidro	581	0.97	581	0.97	119
27. San Pascual	3,015	5.04	3,004	5.03	604
28. San Vicente	987	1.65	987	1.65	211
29. Sentinila	836	1.40	836	1.40	168
30. Sinandigan	1,883	3.15	1,883	3.15	340
31. Tapal	1,136	1.90	1,136	1.90	255
32. Tipolo	2,124	3.55	2,124	3.55	419
33. Tubog	844	1.41	844	1.41	153
34. Tuburan	1,104	1.85	1,104	1.85	203
35. Union	2,042	3.41	2,042	3.42	430
36. Villa Teresita	1,517	2.54	1,517	2.54	272
TOTAL	58,827	100	59,751	100	11,512
Province of Bohol	1,137,268	5.26%			
REGION VII	5,701,064	1.05%			
Philippines	79,498,735	0.08%			

Appendix Table 3. Literacy of the household population 10 Years old and over by age group and sex, 1990

Age group, Sex	Total			Urban			Rural		
	Total	Literate	Illiterate	Total	Literate	Illiterate	Total	Literate	Illiterate
Both sexes	34,249	31,173	3,076	5,594	5,349	245	28,655	25,824	2,831
10-14	6,896	6,981	655	1,047	1000	47	5,849	5,241	608
15-19	5,240	4,981	259	828	808	20	4,412	4,173	239
20-24	4,071	3,897	174	729	720	9	3,342	3,177	165
25-29	3,242	3,097	145	575	558	17	2,667	2,539	128
30-34	2,874	2,720	154	486	472	14	2,388	2,248	140
35-39	2,378	2,221	157	395	380	15	1,983	1,841	142
40-44	1,974	1,829	145	319	313	6	1,655	1,516	139
45-49	1,871	1,691	180	285	273	12	1,586	1,418	168
50-54	1,482	1,516	166	228	218	10	1,254	1,098	156
55-59	1,277	1,053	224	202	183	19	1,075	870	205
60-64	1,051	829	222	171	151	20	880	678	202
65-69	760	559	201	133	114	19	627	445	182
70-74	565	387	178	90	75	15	475	312	163
75-79	315	192	123	61	49	12	254	143	111
80-over	253	160	93	45	35	10	208	125	83

Source: CLUP

Appendix Table 4. Population 7 years old and over by highest educational attainment, age group and sex, 1990.

Highest Educational Attainment	Household Pop'n 7 Years Over	AGE GROUP						
		Below 20	20-24	25-29	30-34	35-39	40-44	>45
Total	38,547	16,434	4,071	3,242	2,874	2,378	1,974	7,574
No grade completed	1,685	502	33	54	44	50	59	943
Pre-school	1,100	1,060	6	3	2	2	1	26
Elementary	25,806	11,767	2,006	1,737	1,809	1,602	1,438	5,447
1 st -4 th grade	14,881	7,886	821	687	758	743	706	3,280
5 th -7 th grade	10,925	3,881	1,185	1,050	1,051	859	732	2,167
High School	6,953	2,702	1,267	895	609	461	308	711
Undergrad	4,632	2,185	714	465	339	268	200	461
Graduate	2,321	517	553	430	270	193	108	250
Post Sec	260	30	77	51	37	24	10	31
Undergrad	72	14	25	15	6	5	3	4
Graduate	188	16	52	36	31	19	7	27
College graduate	1,420	243	430	251	183	109	58	146
Degree holder	1,018	15	215	224	155	106	83	220
Not stated	305	115	37	27	35	24	17	50

Source: CLUP

Appendix Table 4. Population 15 years old and over by sex and employment status, 1990.

Sex	Household Population	In the Labor Force				Not in the labor force	%
		(Economically Active)					
		Employed	%	Unemploy ed	%		
Male	13,699	8,831	32.57	1,521	1.84	3,347	12.34
15-19	2,636	686	2.53	500	1.49	1,450	5.35
20-24	2,199	1,161	4.28	405	0.67	633	2.33
25-29	1,488	1,032	3.81	183	0.22	273	1.01
30-34	1,418	1,184	4.37	60	0.53	174	0.64
35-39	1,220	933	3.44	144	0.21	143	0.53
40-44	1,047	890	3.28	58	0.15	99	0.37
45-49	903	713	2.63	40	0.21	150	0.55
50-54	746	630	2.32	56	0.11	60	0.22
55-59	607	470	1.73	29	0.07	108	0.40
60-64	457	394	1.45	18	0.03	45	0.17
65-69	415	823	3.04	9	0.04	83	0.31
70-74	340	276	1.02	10	0.03	54	0.20
75-79	101	74	0.27	9	-	18	0.07
80 - over	122	65	0.24	-	5.09	57	0.21
Female	13,415	3,423	12.62	1,380	0.93	8,612	31.76
10-14	2,365	528	1.95	252	0.96	1,585	5.85
15-19	2,117	681	2.51	259	0.56	1,117	4.34
20-24	1,509	325	1.20	153	0.41	1,031	3.80
25-29	1,445	348	1.28	110	0.63	987	3.64
30-34	1,169	279	1.03	170	0.23	720	2.66

35-39	932	296	1.09	62	0.37	574	2.12
40-44	963	259	0.96	99	0.20	605	2.23
45-49	715	183	0.67	54	-	478	1.76
50-54	-	-	-	-	0.34	-	-
55-59	691	152	0.56	93	0.24	446	1.64
60-64	620	199	0.73	65	0.07	256	0.94
65-69	452	72	0.27	18	-	362	1.34
70-74	173	46	0.17	-	0.07	127	0.47
75-79	127	27	0.10	18	0.10	82	0.30
80 - over	137	28	0.10	27	10.70	82	0.30
both sexes	27,114	12,254	45.19	2,901	2.77	11,959	44.11

Source: CLUP

App. Table 5. Average family income and expenditures for Bohol families, 1985-1997.

Year	Total No. of families	Income		Expenditure	
		Total (in P1,000)	Average (in P)	Total (in P1,000)	Average (in P)
1985	155,510	2,747,546	17,668	2,141,387	13,770
1988	168,351	3,178,686	18,881	2,450,829	14,558
1991	178,916	5,593,965	31,266	4,258,908	23,804
1994	186,580	7,124,909	38,187	5,381,100	28,841
1997	202,806	11,547,723	56,940	10,293,160	50,754

Source: NCSO-FIES

App. Table 6. Sources of income for Bohol families, 1985-1997.

Source	85		88		91		94		97	
	N	%	N	%	N	%	N	%	N	%
No of families	155,510		168,351		178,916		186,580		202,806	
Wages and Salaries	38,506	25.0	41,049	24.0	39,284	22.0	50,313	27.0	68,434	34.0
Agricultural	65,735	42.0	83,440	50.0	81,485	46.0	73,504	39.0	75,197	37.0
Non-agricultural	15,743	10.0	13,909	8.0	23,339	13.0	19,513	10.0	15,597	8.0
Others	35,527	23.0	29,953	18.0	34,809	19.0	43,251	23.0	43,579	21.0

Appendix Table 7. Land area by barangay, 2002.

Barangay	Area Approved from DENR/ LGU Area (ha.)	% to Total
A. Urban Barangays	873.59	2.92
Urban Center 1		
1. Bood	152.00	0.51
2. Fatima	75.10	0.25
3. Poblacion	199.00	0.66

4. Tapon	153.10	0.51
Urban Center 2		
5. Cuya	65.60	0.22
6. Guintabuan	66.00	0.22
7. Juagdan	131.00	0.44
8. Tintinan	31.79	0.11
B. Rural Barangays	29,077.29	97.08
1. Achila	384.00	1.28
2. Bay-ang	632.00	2.11
3. Benliw	588.885	1.97
4. Biabas	2,200.00	7.35
5. Bongbong	161.2939	0.54
6. Buenavista	651.54	2.18
7. Bulilis	739.7901	2.47
8. Cagting	1,044.00	3.49
9. Calangaman	617.9729	2.06
10. California	319.3622	1.07
11. Camali-an	532.24	1.78
12. Camambugan	547.00	1.83
13. Casate	460.00	1.54
14. Gabi	1,646.00	5.50
15. Governor Boyles	824.40	2.75
16. Hambabaoran	521.8956	1.74
17. Humayhumay	815.43	2.72
18. Ilihan	1,683.00	5.62
19. Imelda	657.16	2.19
20. Katarungan	408.56	1.36
21. Lomangog	642.1028	2.14
22. Los Angeles	274.4039	0.92
23. Pag-asa	377.9794	1.26
24. Pangpang	450.00	1.50
25. San Francisco	1107.133	3.70
26. San Isidro	262.00	0.87
27. San Pascual	972.6977	3.25
28. San Vicente	4965.8237	16.58
29. Sentinila	271.00	0.90
30. Sinandigan	607.278	2.03
31. Tapal	289.50	0.97
32. Tipolo	655.00	2.19
33. Tubog	444.4174	1.48
34. Tuboran	547.7415	1.83
35. Union	514.00	1.72
36. Villa Teresita	1,261.68	4.21
TOTAL	29,950.88	100.00
Province of Bohol	411,730.00	7.27
Region VII	1,495,140.00	2.00
Philippines	30,000,000.00	0.10

source: NCSO/DENR/BL/Cadastral Survey/LGU

App. 8. Table Land Capability Classification, 2002

Land Capability Classifications	Land Capability Characteristics	Soil Characteristics	Flood Hazard Condition	Slope/ Erosion Potential Condition	Land Area Coverage	
					In Has.	%
"A"	Very good land, can be cultivated safely, requiring only simple but good farm management practices.	No to slight soil limitations; loamy profile	No to slight flooding ; well drained	Level to nearly level; no to slight erosion	14,117.77	47.14%
"Cce"	Moderately good land; must be cultivated with caution; requires careful and intensive conservation practices	Moderate soil condition limitation	No to slight flooding hazard	Moderately slope, severely eroded	4,844.33	16.17%
"Cw"	-do-	Moderate soil limitation; fine soil permeability	Moderate flooding hazard	Level to nearly level; no to slight erosion	2,476.04	8.27%
"Dw"	Fairly good land; must be cultivated w/ extra caution ; requires careful management & complex conservation practices for safe cultivation; more suitable for pasture	Very poor permeability	Severe flooding	Level to nearly level	4,365.36	14.58%
"Ds"	- do-	Serious soil conditions limitation	No to slight flooding hazard	Gently to moderately sloping; slightly eroded	790.35	2.64%
"LLw"	Level to nearly level too stony or very wet for cultivation; limited to pasture or forest with careful management	Very wet	Severe to very wet	Level to nearly level; no slight erosion	221.06	0.74%
"N"	Steep land; very severely eroded; shallow for cultivation; limited to pasture or forest	Soil too shallow for cultivation	No flooding	Very steep; severely eroded	226.61	0.76%

	w/ careful management					
"X"	Level land; wet most of the time & cannot be economically drained; suited for fishpond or recreation	Wet most of the time	Very severely flooding hazard	Level; no slight eroded	1,103.24	3.68%
"Y"	Very hilly & mountainous, barren & rugged, should be reserved for recreation & wildlife or for reforestation	Rugged and mountainous	No flooding	Very hilly, very severely eroded	1,806.12	6.03%
Total					29,950.88	100.00

Table 24. Area planted to mango, Bohol, 2003.

Municipality	Area (ha)	%
ALBURQUERQUE	18.14	0.51
ALICIA	64.54	1.81
ANDA	8.33	0.23
ANTEQUERA	11.97	0.34
BACLAYON	37.64	1.05
BALILIHAN	235.24	6.59
BATUAN	37.53	1.05
BIEN UNIDO	70.2	1.97
BILAR	35.77	1.00
BUENAVISTA	202.57	5.68
CALAPE	92.4	2.59
CANDIJAY	66.55	1.87
CARMEN	96.17	2.70
CATIGBIAN	56.84	1.59
CLARIN	129.43	3.63
CORELLA	59.2	1.66
DAGOHOY	37.39	1.05
DANAO	150.78	4.23
DAUIS	123.91	3.47
DIMIAO	69.98	1.96
DUERO	83.28	2.33
GARCIA HERNANDEZ	27.32	0.77
GETAFE	78.35	2.20
GUINDULMAN	82.23	2.30
INABANGA	69.73	1.95
JAGNA	40.05	1.12
LILA	8.56	0.24

LOAY	12.35	0.35
LOBOC	25.53	0.72
LOON	19.14	0.54
MABINI	44.94	1.26
MARIBOJOC	41.41	1.16
PANGLAO	81.56	2.29
PILAR	182.34	5.11
PRES. GARCIA	57.56	1.61
SAGBAYAN	56.09	1.57
SAN ISIDRO	5.54	0.16
SAN MIGUEL	260.49	7.30
SEVILLA	19.53	0.55
SIERRA BULLONES	87.41	2.45
SIKATUNA	1.09	0.03
TAGBILARAN	20.32	0.57
TALIBON	101.1	2.83
TRINIDAD	122.46	3.43
TUBIGON	69.1	1.94
UBAY	297.75	8.35
VALENCIA	68.1	1.91
Total	3,567.91	100.00

App. Table 10. Area, number and location of CARPable areas, 2000

Barangay	No. of LO		No. of FBs		Area in Hectares		TOTAL	
			OLT	CA	VOS	GFI	GOL/ NRDP	
Achila	4	62	11	126				137
Bay-ang	5	74	39					39
Benliw	4	141	4	37			228	269
Biabas	5	30	15			10		25
Bongbong	1	6			5			5
Bood	11	59	56	29				85
Buenavista	3	31	31					31
Bulilis	3	352	439	198	17			654
Cagting	2	203	43	139	191			373
Calanggaman	8	32	8	37		4		49
Camali-an	9	74	7	15	56			78
Camambugan	12	57	6	126				132
Casate	13	35	23	45			1	69
Gabi	15	85	45	117		1		163
Gov. Boyles	7	43	23	12	13			48
Hambabauran	3	18	14	26				40
Humayhumay	5	31	7	11	38	7		63
Ilihan	5	18	8	7				15
Imelda	1	178					516	516
Katarungan	3	18	4	20				24
Lomangog	3	35	21	9	15			45
Pangpang	5	103	68		14	14		96
Pag-asa	3	6	2	19				21
San Francisco	2	313	1	673				674
San Isidro	1	1	1					1
San Vicente	1	3			8			8
Sentinela	1	3	6					6
Sinandigan	4	126	10	69	42		226	347
Tapal	3	12	1	18				19
Tipolo	3	10	4	7			1	12
Tubog	7	51	49		46			95
Tuburan	10	75	25	31	45			101
Union	4	8	5	14				19
Villa Teresita	5	24	16	17				33
Total	171	2317	992	1137	1155	36	972	4292

*Distributed & for Acquisition, LO-land owner, FBs-Farmer Beneficiaries, OLT-Operation Land Transfer
CA - Compulsory Acquisition, VOS - Voluntary Offer to Sell, GFI - Gov't. Financing Institution

App. Table 11. Status of Agrarian reform program implementation

	PHASE I						PHASE II			PRIVAT 24-50
	OLT PD 27	VOS	VLT	GOL	GFI	SUB TOTAL	AWARD	PRI. AGRI. LANDS >50	SUB TOTAL	
Scope	937	1,139	80	1000	124	50	56	282	338	229
LESS: DEDUCTIBLES	24	17	8	30	92	3	-	95	95	70
TOTAL WORKING	913	1,122	72	970	32	47	56	187	243	159

SCOPE										
LESS: ACCOMPLISHMENT February 2004	848	1,093	56	960	14	47	23	0	23	58
GROSS BALANCE	65	29	16	10	18	0	33	187	220	101
LESS: PROBLEMATIC	65	15	16	10	18		19	184	203	101
NETWORKING BALANCE	0	14	0	0	0		14	3	17	0
WHEREABOUTS OF THE BALANCE										
A. MARO Level										
1. w-out documentation										
2. on-going documentation							14		14	
B. PARO Level										
1. Receipts from DARMO for review								3	3	
2. Receipts from LBP for completion of doc.										
3. Survey A. For survey										
B. On-going										
1. by admin.										
2. contracted										

SCOPE	PHASE I						PHASE II			
	DLT PD 27	VOS	VLT	GOL	GFI	SUB TOTAL	AWARD	PRI. AGRI. LANDS >50	SUB TOTAL	PRIVATE 24-50
4. Preparation of EP/CLDA										
C. LMS										
1. Verification/ Approval of Survey										
D. LBP										
1. On-going valuation A. Main		14								
B. LVO										
2. W/ approved Memo of valuation A. LVO										
B. Main										
E. ROD Registration of EP/CLOA										

Source: Municipal Agrarian Reform Office, Municipality of Ubay

App. Table 12. programs and Projects,

PROGRAM/PROJECT/ACTIVITIES	TARGET
Food Security Programs:	
Promotion of Improved Crop Production Technologies	
A. Ginintuang Masaganang Ani-Rice	
a. Irrigated Rice	1,161 has.
b. Rain-fed areas	5,030 has.
1. Conduct information drive on certified seed subsidy and assist farmers to avail the program	1000 has. 1000 farmers
2. Conduct rice production refresher course and technical briefing	38 farmers
3. Render technical assistance	800 farmers
4. Campaign farmers to plant hybrid rice and to avail hybrid rice seeds subsidy	300 farmers 250 has.
5. Crop insurance information to farmers	150 farmers
6. Preparation of Project Proposal	
B. GMA Corn	
a. Hybrid yellow corn production No. of Cooperators	400 has. 350 farmers
b. OPV	120 farmers 75 has.
1. Conduct orientation and technical briefing and information drive on seed exchange program	15 bgys
2. Established demo-farms	2 demo-farms
3. Assist farmers to avail financial assistance	50 farmers
4. Facilitate marketing opportunities to corn growers	250 farmers
5. Render technical assistance	250 farmers
6. Solicit insurance for corn growers	75 farmers
C. Ginintuang Masaganang Ani - HVCC	
Mango Production	
1. Established updated data on mango	1 Prof.
2. Strengthening of Ubay Mango Growers Organization	1 organization
3. Facilitate monthly meeting	12 meetings
4. Facilitate seminar on mango production	1 seminar
5. Render technical assistance	160 farmers
Ornamentals and cutflower production	
1. Render technical assistance	60 cooperators
2. Strengthening of Organization	1 organization
3. Established communal sites for display of ornamentals	1 site
4. Established demo-farms	2 demo-farms
Ubi Production	
1. Identification of Cooperators	25 farmers
2. Strengthening of Ubi Growers Association	1 org
3. Refresher course on ubi production	1 course
4. Render technical assistance	25 cooperators
5. Facilitate farmers group to avail financial assistance	25 farmers
6. Established demo-farm	1 demo-farm

Banana Production	
1. Information dissemination and campaign for backyard or under coconut planting of different variety of banana	40 bgys
2. Strengthening of organization	1 org
3. Render technical assistance	1,300 farmers
Vegetables Gardening	
1. Promotion of organically grown vegetables seeds thru FA, RIC, IA and cooperatives	42 barangays
2. Render technical assistance	1,600 farmers
3. Distribution of vegetable seeds thru FA, RIC, IA and cooperatives	32 orgs
Backyard Fruit Trees Planting	
1. Information dissemination and encourage homemakers, farmers and youth to plant fruit trees	32 assisted organizations
2. Render technical assistance	1,500 farmers
Root Crop Production	
Cassava	
1. Information dissemination and campaign for cassava production	450 hectares
2. Render technical assistance	500 farmers
3. Facilitate marketing opportunities of the crop	120 farmers
Sweet Potato	
1. Identification of cooperators	150 farmers
2. Number of hectares assisted	120 hectares
3. Established demo-farms	5 demo-farms
4. Render technical assistance	150 farmers
Legume Production	
A. Mongo	
1. Identification of cooperators	50 farmers
2. Technical Assistance	50 farmers
3. Number of hectares planted	20 hectares
B. Peanut	
1. Identification of cooperators	50 farmers
2. Number of hectares planted	5.0 hectares
3. Render technical assistance	20 farmers
Backyard Fruit Trees Planting	
a) Information dissemination and encourage farmers and homemakers and youth to plant fruit trees	32 assisted organizations
b) Render technical assistance	1,500 farmers
Industrial Crops - Romblon Production	
a) Campaign for romblon planting	32 org
b) Render technical assistance	1,200 coop'rs
Cacao	
a) Information dissemination and to encourage farmers to plant cacao	32 org

b) Render technical assistance	50 farmers
Promotion and Dissemination of Improved Technology on Animal Production, Health Care and Management	
A. Conduct trainings and seminars on health management of poultry and livestock	10 trainings 10 bgys 600 farmers
B. Information campaign conducted on: 1. Rabies 2. Forage and pasture 3. Animal Health	1,200 dog-owners 60 farmers 1,200 farmers
C. Conduct vaccination on disease prevention 1. Hemsep - Cattle 2. Carabao 3. Anti-hog cholera	2,500 heads 2,500 raisers 2,500 heads 1,500 heads 1,000 raisers
D. Deworming of Farm Animals 1. educate farmers-cooperators of the importance of deworming 2. assist in deworming of large cattle and swine	600 raisers 600 raisers
E. Livestock and Poultry Upgrading Program	
a) Maintained animal breeders	
1. Carabao	6 heads
2. Cattle	5 heads
3. Boar	5 heads
Number of Recepients	21 recepients
b) AI to swine	
1. Maintained Boar at Ubay Agri-Park	1 head
2. Conduct AI to swine in different barangays in Ubay	60 heads
c) Maintenance of Stocks of New Hampshire Sasso, Kabir in coordination with OPV at Ubay Agri-Park	45 heads
1. Dispersal of chicks (2 weeks old)	240 heads
2. Egg dispersal to interested recepients	240 heads
d) Monitoring of animal dispersal	
1. carabao	43 heads
2. cattle	141 heads
3. swine	458 heads
4. goat	29 heads
5. ducks	10 heads
Maintenance of Municipal Nursery	
1. Collection and propagation of seeds of nutritious fruits	
a) jackfruit	500
b) chicos	500
c) star apple	500
d) mango	500
2. Forest trees	
a) mahogany	250
b) gmelina	250
3. Ornamental tree	

a) Indian Tree	500
Nursery Improvements	
1. Fencing the MAO and nursery	1
2. Planting of ornamentals	
3. Landscaping	
Maintenance and Sanitation of the Municipal Nursery	1
I. Coastal Resource Management Program	
A. Rehabilitation of Coastal and Marine Resources	
1. Conduct awareness seminar on CRM (IEC)	20 bgys
2. Facilitate validation and presentation of PCRA	20 bgys
3. Establishment of fish sanctuary	2 bgys
4. Conduct training on fish sanctuary establishment	2 bgys
5. Establishment of barangays mangrove garden	3 bgys
II. Aqua-culture Development Program	
1. Fresh Water Tilapia Culture at SFR	50 SFR 50 farmers
2. Distribution of Tilapia Fingerlings	50 farmers
3. Render technical assistance	50 farmers
Bangus Production	
1. Assistance on Bangus Production	250 has
2. Render technical assistance	50 operators
Prawn Production	
1. Render Technical Assistance	8 operators
Institutional Strengthening:	
A. Rural Improvement Clubs	
1. Reorganization and revitalization of RIC	18 bgys
2. Conduct of monthly meetings	18 RICs
B. Farmers Association	
1. Reorganization and revitalization of FAs	25 bgys
2. Conduct of monthly meetings	25 fas
C. Facilitate AFC formation to barangays	44 bgys
D. Facilitate Formation of MAFC	1 MAFC
1. Number of members	44 members
2. Facilitate monthly meetings	12 meetings
Evaluation of Projects to Different RIC and FA	
Achievements	
Preparation of Municipal Agri-Fair	2 Agri-Fairs
1. Establishment of Booth and Display of Agricultural Products and Fishery	10 Booths