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The LGU Extension Services in a Major Rice-Growing Area: The Case of Hagonoy, Davao del Sur

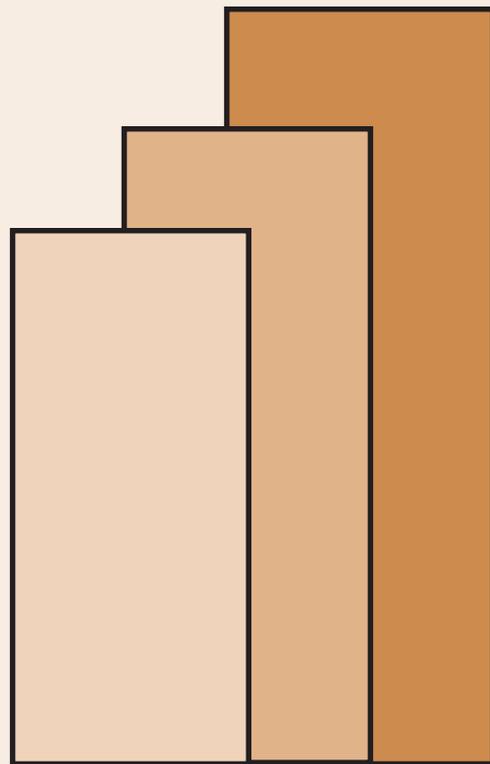
Rosa Fe D. Hondrade

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**THE LGU EXTENSION SERVICES IN A MAJOR
RICE-GROWING AREA: THE CASE OF HAGONoy,
DAVAO DEL SUR**

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Abstract

The province of Davao del Sur is considered one of the major rice-producing provinces of Region XI. It has been regarded as Mindanao's top rice-yielding province because of its municipality's (Hagonoy) high yield performance. Hagonoy's average rice yield of more than six tons per hectare has consistently been higher than the provincial average of a little more than five tons per hectare, both of which are higher than the regional average of more than four tons per hectare. In Hagonoy, some 1,436 farmers who are also mostly farmer-cultivators are actively engaged in rice farming over a total rice area of 2,046 hectares.

The Office of the Municipal Agriculture (OMAG) handles the extension services related to agriculture and fisheries as well as cooperative development. Manning the office are: one (1) municipal agriculture officer (officer-in-charge) and eight (8) agricultural technologists to cover 21 barangays in the municipality. Understaffed, the office follows a simple organizational structure, generally flat with only two levels (head → ATs). Each staff has been assigned to handle different programs and 2–3 barangays. To cope with its situation of delivering agricultural programs and services to all its 21 barangays with limited personnel, the OMAG adopts the following strategy: a) ATs handle one or more programs covering two or more barangays; b) strengthen linkages with local, provincial, regional and national offices that implement agriculture programs; c) prioritize its programs with banner programs given full support and providing assistance to linkage programs (public or private); d) strengthen its cooperatives and farmers' organizations to lend support in technology dissemination, pest and technology performance monitoring, and community mobilization; and exploit the use of information technologies like cell phones.

The study has shown that farmers have multiple sources of information within a given farming system. In addition to formal institutions like the national and regional agencies, the provincial and municipal agriculture services of the local government units, farmers seek out or exchange information and knowledge with input suppliers, traders and other private individuals who have stakes in rice production and marketing. Much of the information travels freely but some may also come with a fee. Such stakeholders (public or private) in rice may interact either to fulfill their needs or to pursue their interests. And as they interact with one another, information on prices, market opportunities, new technologies and practices as well as policy changes is also exchanged.

Keywords: agriculture extension, rice-growing area, municipal agriculture services, knowledge management

THE LGU EXTENSION SERVICES IN A MAJOR RICE-GROWING AREA: THE CASE OF HAGONUY, DAVAO DEL SUR^{1/}

CHAPTER 1

HAGONUY, DAVAO DEL SUR: ITS SOCIO-ECONOMIC PROFILE

A. *The Province of Davao del Sur*

Covering 14 municipalities and one city, Davao del Sur is predominantly an agricultural province located at the southern part of Region XI. It is bounded by Davao City on the north; the provinces of North Cotabato, South Cotabato and Sarangani on the west; Celebes Sea on the south and Davao Gulf on the east. Strategically located, the province lies between two major growth centers: General Santos City of Region XII and Davao City of Region XI (Figure 1).

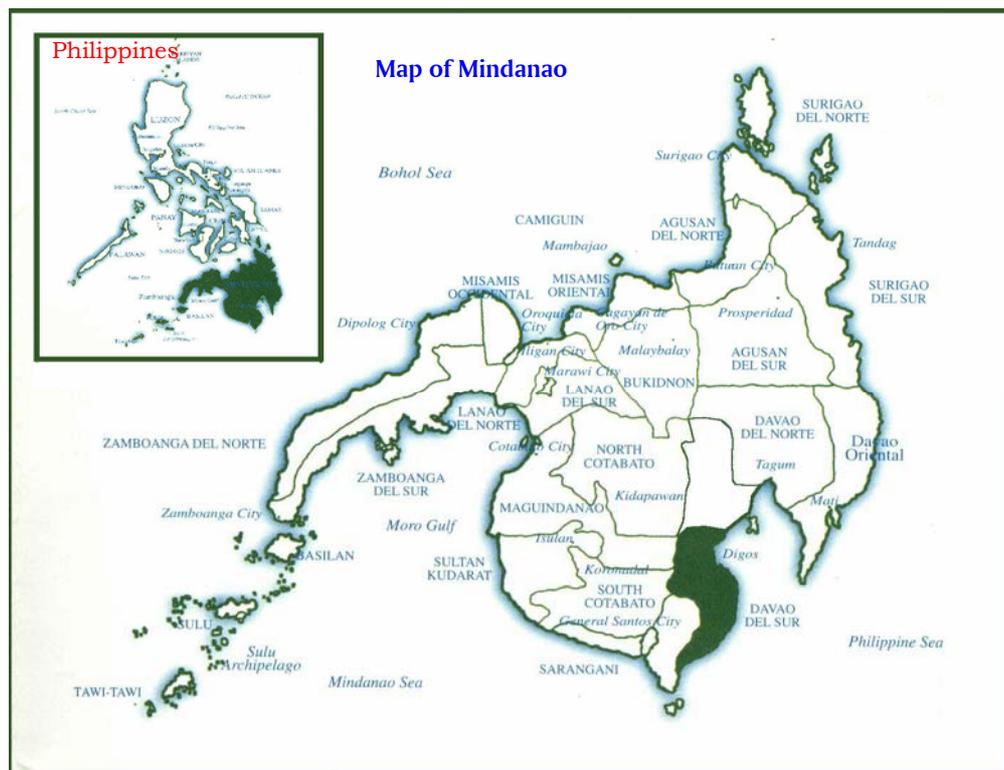


Figure 1. Map of Mindanao

^{1/} Case study prepared by Rosa Fe D. Hondrade, University of Southern Mindanao, Kabacan, Cotabato, July 2005.

1. Agro-climatic characteristics

Davao del Sur occupies an area of 393,401 hectares or 3,934.01 square kilometers which represents 20.01 percent of the total land area of Region XI (Table 1). It is the 3rd largest province in the region in terms of land area.

Very varied in landscape characterized by terrain ranging from plain and rolling to hilly and mountainous, Davao del Sur has lowland (99,880 has), upland (70,668 ha), hillyland (73,539 ha), and highland (148,757 ha) plus some miscellaneous (which include creek, braided, riverbed, lake and quarry: 557 ha) areas. Its low-lying coastal areas are most suited for the development of aquaculture products like prawn, bangus, tilapia and crabs. The relatively flat portions of the province are mostly located in the municipalities of Hagonoy, Magsaysay, Kiblawan, Padada, Sulop and Digos City – comprising the Padada Valley to which irrigated areas are mostly found.

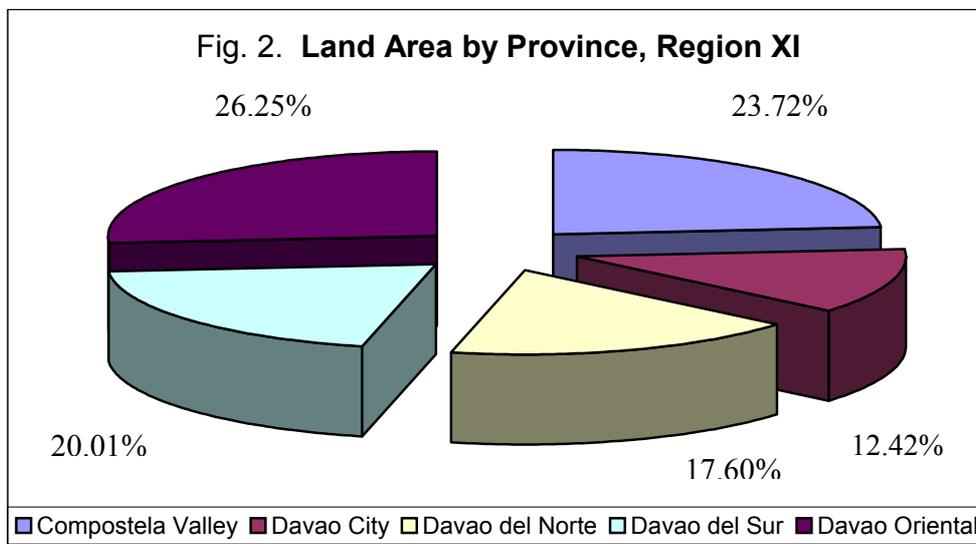
Approximately 40% or 15.62 sq km of the total land area of Davao del Sur falls within the 0-200 meters elevation. Matanao has the widest lowland area with 1.96 sq km while Bansalan has the least with only 0.165 sq. km.

Favored by a good climate very well suited to crop and livestock production, the province lies outside the typhoon belt. Its climate is characterized by uniform annual distribution of rainfall (Type IV – less high rainfall), temperature, humidity and air pressure. The rainy period comes with the northeast monsoon rains in December and January but gradually weaken in late February and March. The southeast monsoon rains bring substantial rainfall from June to October.

Table 1. Land area by province, Region XI (square kilometers), 1999.

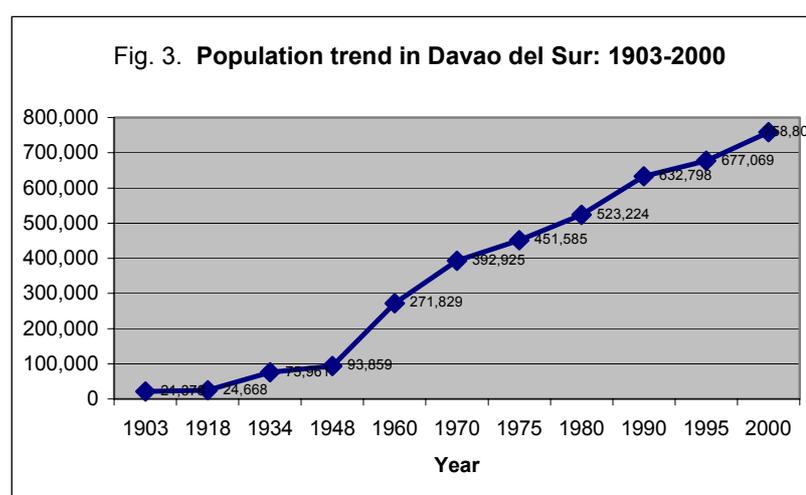
Province/City	Land Area	% Distribution
Compostela Valley	4,666.93	23.72
Davao City	2,443.61	12.42
Davao del Norte	3,462.82	17.60
Davao del Sur	3,934.01	20.01
Davao Oriental	5,164.46	26.25
Total	19,671.83	100%

Source: *Technical Working Group on Geographic Classification, NSCB DENR, Region XI, 1999.*



2. Population characteristics

Davao del Sur registered a total population of 758,801 in 2000. The figure represents a 12% growth from the 1995 population census of 677,069. Its annual growth rate of 2.47% is very close to the national annual growth rate of 2.5% (Table 2). Highest annual growth rate of 9.27% occurred in 1960. But, it drastically went down to a low of 3.75% in 1970. Based on the data from NSO, Davao del Sur had a total dependency ratio of 74.74 percent in 2000. This means that for every 100 persons aged 15-64 years, there were about 75 dependents (69 persons aged 0 to 14 years-young dependents and six persons aged 65 years and over-old dependents).



Compared with other provinces in the region, Davao del Sur ranks highest in terms of number of households with a total of 157,054 (2000) and comes second to Davao del Norte in average household size of 4.83 (Table 3). It is likewise highest in population density of 193 persons per square kilometer. Simply put, Davao del Sur is more densely populated than any other province in the region.

Table 2. Historical growth of population of Davao del Sur, 1903-2000.

Year	Total Population	Percent (Increase/Decrease)	Average Annual Growth Rate (%)
1903	21,378		
1918	24,668	15.39	0.96
1934	75,961	207.93	5.5
1948	93,859	23.56	2.38
1960	271,829	189.61	9.27
1970	392,925	44.55	3.75
1975	451,585	14.93	2.82
1980	523,224	15.86	2.99
1990	632,798	20.94	1.92
1995	677,069	7.00	1.36
2000	758,801	12.07	2.47

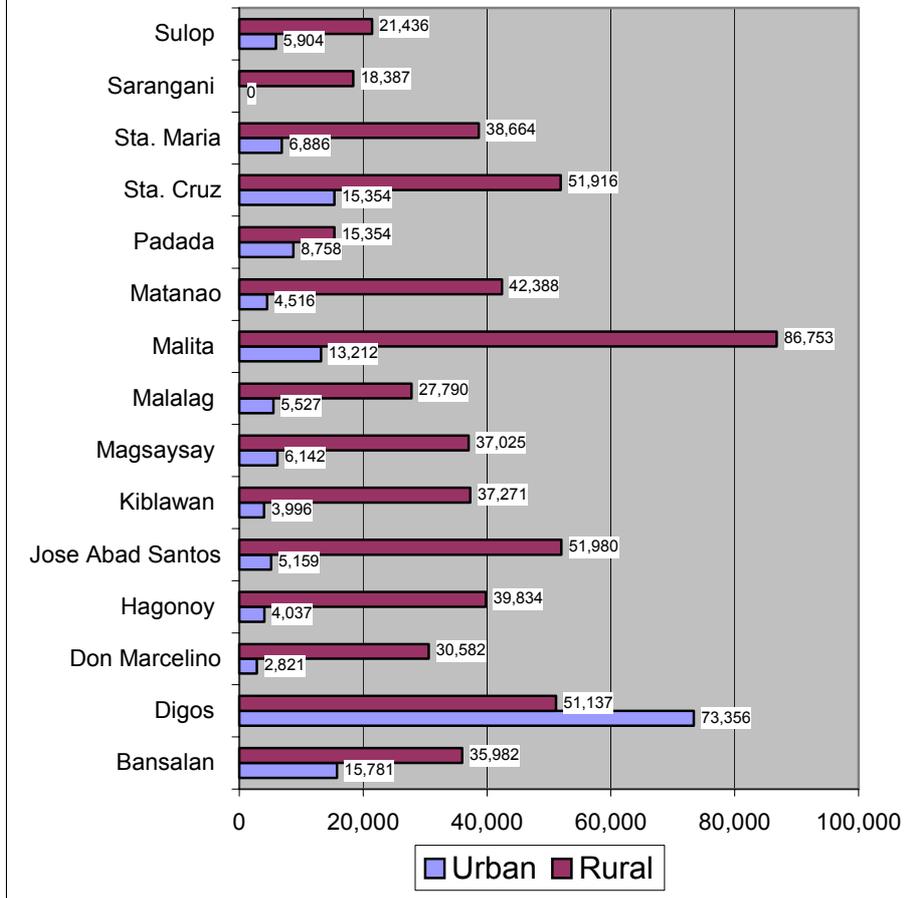
*Source of Basic Data: 1995 Census of population
Report Nn.2-35k. Socio-Economic and Demographic Characteristics, Davao NSO*

Table 3. Total population number of households, average household size, population growth rate and population density in Region XI as of May 1, 2000.

Region XI	Total	Number of Households	Average HH Size	Annual Growth Rate		Population Density
				1995-2000	1990-2000	
Compostela Valley	580, 244	120, 766	4.8	2.37	2.21	140
Davao del Norte (Davao)	783, 811	150, 844	4.92	2.22	2.34	186
Davao del Sur	758, 801	157, 054	4.83	2.47	1.83	193
Davao Oriental	446, 191	86, 569	5.15	1.64	1.23	-86

Source: NSO, Region XI

Fig. 4. Population density by municipality, Davao del Sur: 2000



3. Literacy

The province enjoys a high literacy rate of about 86 percent of the total population of 10 years old and over (SEP, 2000). By location, more literates (72.88%) are found in the rural areas as compared to 27.12 percent in the urban areas.

The greater proportion of rural to urban areas in the province may explain why a higher percentage of literates resides in the rural areas. Among the 5 years old and over group, about 84 percent finished at least the elementary grades. Very few finish college and fewer still are those who finish graduate study programs.

Table 4. Household population 5 years old and over by highest educational attainment in Davao del Sur, 2000.

Highest Educational Attainment	Household Population (5 Years old & over)	Male	Female
Davao del Sur	661,485	338,961	322,524
No-Grade Completed	76,161	38,923	37,238
Pre-School	13,344	6,796	6,548
Elementary	341,222	182,293	158,929
High School	146,987	71,819	75,168
Post Secondary	9,315	4,713	4,602
College Undergraduate	42,482	20,026	22,456
Academic Degree Holder	14,066	5,498	8,568
Post Baccalaureate	1,800	750	1,050
Not Stated	16,108	8,143	7,965

Source: NSO, 2000.

B. The Case Study Site: Municipality Hagonoy, Davao del Sur

1. Historical Background

Hagonoy was formerly a sitio of barangay Digos (now Digos City) which was one of the barangays of Sta. Cruz municipality. When the municipality of Padada was created in 1949, Hagonoy became one of its barangays. Through Executive Order No 596 issued by President Elpidio Quirino on May 28, 1953, Hagonoy was separated from Padada and became a regular municipality. Classified as third class, a total of 21 barangays comprise the municipality, 5 of which are coastal and two urban.

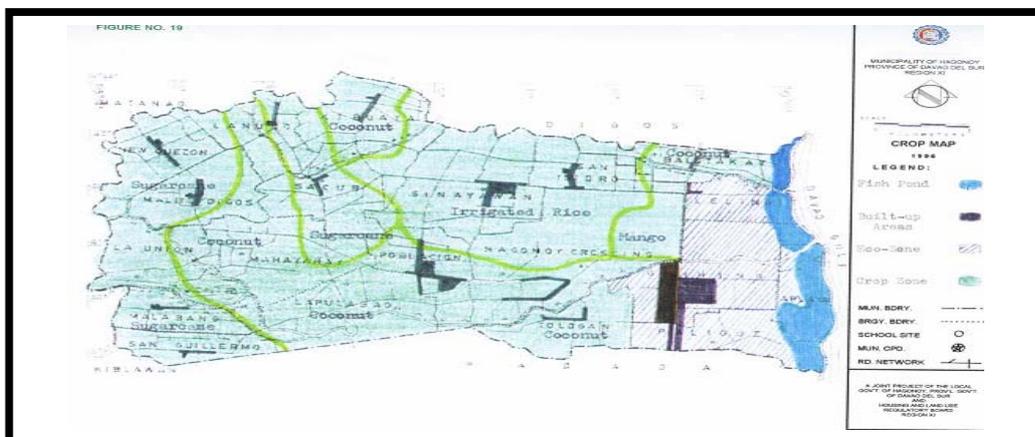


Figure 5. Map of Hagonoy, Davao del Sur

The present area occupied by the municipality was once the tribal domains of highlanders: the Calagans, Bilaans, and Samal Muslims. In early 1900, a group of enterprising Americans acquired the coastal plains where the Calagans lived and developed the leased area into a coconut plantation. This plantation, known as Mindanao Estate Company, became the nucleus of economic and social activities in the Padada Valley. Meanwhile, a number of Japanese nationals acquired the outlying hinterlands and cultivated the area into ramie, abaca, and coconut farms. They also engaged in commercial piggery and poultry projects. When World War II erupted these Japanese in the Itakura Farm in Guihing turned out to be soldiers of the Japanese Imperial Army. After the Second World War, the Japanese plantations were taken over by the American troops and later taken over and administered by the Government through the National Fiber Corporation (NAFCO). These properties were later sold to the actual occupants when the Corporation was phased out.

Accounts of early settlers have indicated that the term “Hagonoy” is derived from a name of a vine that grew abundantly along the banks of Padada (Hagonoy) River, and nearby corn and coconut fields.

2. Geographical Location and Accessibility

Hagonoy comprises a total land area of 12,433 hectares covering 27 barangays. It is bounded on the north by Digos City, on the south by Padada, on the east by Davao Gulf and on the west by Matanao. It is highly accessible, requiring a journey in tricycle or jeepney/multicab up to 15 minutes to reach the national highway leading to Digos City markets. The presence of cell sites allows the residents of Hagonoy to use conveniently mobile phones as means of communication.

3. Agro-climatic characteristics

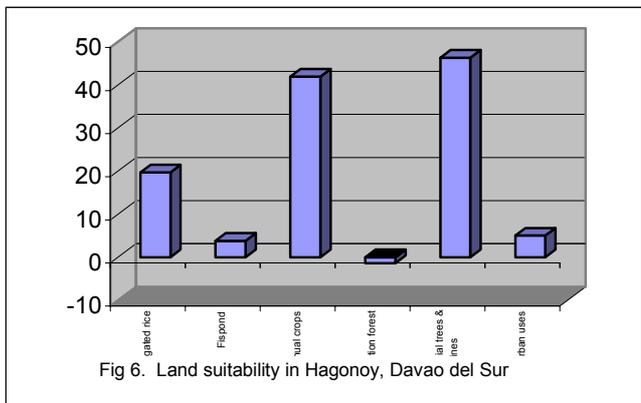
The topography of the municipality is relatively flat. Most areas in the municipality have level to nearly level slopes (0-3% slopes). Hagonoy is generally a lowland area as all its areas fall within the 0-200 meters elevation.

About 82% or 9,603 hectares in Hagonoy have soils belonging to the San Manuel silty clay series. This type of soil is generally adaptable to most agricultural crops, especially coconut and lowland rice. More than 1,000 hectares have soils belonging to the Matina clay series. This type of soil is largely used for corn, sugarcane and irrigated lowland rice.

Table 5. Dominant soil types and its basic description, Hagonoy, Davao del Sur.

Soil Type	Area (has)	Dominant Terrain	Use
San Manuel silty clay loam	9,603	Level to nearly level	Utilized for coconut, lowland rice, adaptable to most agricultural needs
Malalag clay	971	Hilly to mountainous	Limited agricultural use due to its thin soil profile: inherently low fertility and rough topography. Suited to pasture and forestry with applied soil conservation measure
Matina clay	1,244	Nearly level to undulating	Largely utilized for corn and sugarcane. Excellent for lowland rice when irrigated

In terms of land suitability, the municipality has the largest area suitable to perennial trees and vines (4,628 has), annual crops (4,190 has) and irrigated rice (1,965 has). Forest areas have shrunk over time.



4. Population characteristics

Hagonoy has a population of 43,871 (Table 6). The average population growth rate of the municipality had dramatically increased from 1960 to 1980 censal years of 1.26% in 1970, 2.65% in 1975 and 3.23% in 1980 (Figure 7). These marked increases could be attributed to the establishment of agri-industries in the municipality like the Davao Sugar Central Company, Inc. (DASUCECO), the Guihing Agricultural Development Corporation (GADECO) and Cocoa Investors Inc. (CII). These companies recruited workers with special skills in their respective operations from outside of the municipality and the province that later took permanent residence in the municipality. The other

factors that partly contributed to the population increase were the unstable peace and order condition prevailing in the other parts of the province at that time and the boom in sugar, commercial bananas, and cacao industries.

Table 6. Historical growth, population, growth rate and trend, Hagonoy, Davao del Sur.

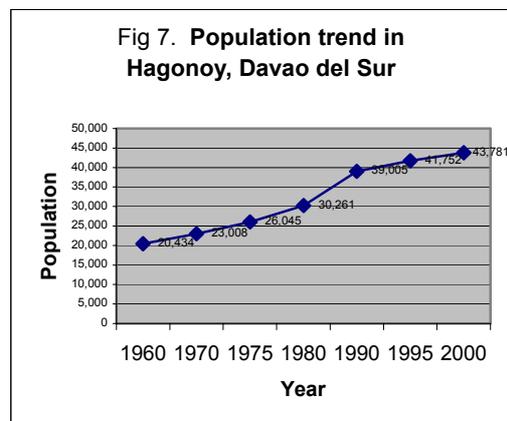
Year	Actual population	Average growth rate
1960	20,434	-
1970	23,008	1.26
1975	26,045	2.65
1980	30,261	3.23
1990	39,005	2.57
1995	41,752	1.37
2000	43,871	1.93

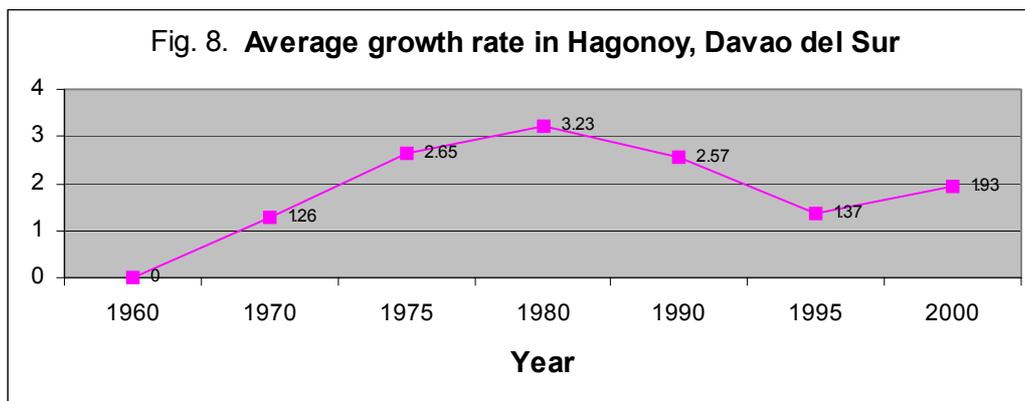
Source: National Statistics Office, Davao City

Table 7. Estimated population, Hagonoy, Davao del Sur: 2001-2004.

	2000	2001	2002	2003	2004
No. of households	8990	9080	90480	9574	9669
No. of farm families	4100	4150	4192	4233	4273
No. of fishing families	400	570	382	390	390
No. of non-agri household		4360	4370	4400	4441
Major means of livelihood	Farming, fishing				
Major Tribe	Cebuano, Ilonggo, Ilocano, Leytenos, Boholanos				

However, from 1980 to 1990, it was observed that for the ten-year inter-censal period, the average population growth rate went down to 2.57%. The slow down in population growth may be attributed to the massive/intensified campaign on population control program, the decreased activity in sugar production and lack of employment opportunities within the municipality to absorb the increasing number of new entrants to the labor force annually. The popul 2.57% in 1990 to only 1.37% in 1995. However, rose to 1.93.





Average household size in Hagonoy is 4.72 for about 9,293 total number of households. Expectedly for a rural municipality, 90 percent of its households are located in the rural areas. Population density in the rural areas, however, is lower at 354 persons per square kilometer compared to 961 in the urban areas. Only two barangays are classified urban while the 19 others are rural.

Table 8. Labor force, Hagonoy, Davao del Sur.

	2001	2002	2003	2004
No. of farmers	1860	1840	1850	1850
No. of fishermen	570	382	390	390

5. Literacy

The municipality has a high literacy rate of 94 percent or 28,085 out of 29,843 total of 10 – 80 years old and over population. Only 6 percent are considered illiterate. Similar trends are observed in both urban and rural population. A slightly higher incidence of illiteracy at 7 percent occurs among the 10-14 years old age group in the urban barangays as compared to the 4 percent among the same age group in the rural barangays. While elementary education is free, extreme poverty forces school age youth to provide family labor on the farm thus forcing school children to quit schooling.

High student participation in the elementary grades could be due to the presence of 21 public elementary schools (Tables 9 and 10). Apparently, parents of elementary school age children in Hagonoy have encouraged them to finish elementary education. However, only about a third of the high school age group finished high school from 1997 to 1999. Higher participation in the secondary level rose to more than 50 percent in 2000.

Table 9. Participants rate (in percent) by level in Hagonoy: 1997-2000.

	1997	1998	1999	2000
Elementary	115.68	117.65	117.12	109.37
Secondary	35.70	33.84	37.07	54.11

Table 10. Number of public and private schools, by level in Hagonoy:2000.

	Elementary	Secondary
Public	21	1
Private	0	1

6. Health

Due to inadequate health facilities, common deaths are caused by both chronic and degenerative diseases like cardiovascular, cancer, infections as well as parasitic diseases like pneumonic and pulmonary tuberculosis. Poor living conditions have been blamed for the occurrence of these diseases. Added to this is the fact that not all community members have easy access to health services.

There is only one health center in Hagonoy, two (2) drug stores, three (3) private primary clinics with a total capacity of 55 beds to serve a population of 46,065 from 21 barangays. Only ten (10) barangays have health stations. Evidently, health facilities and manpower in Hagonoy are inadequate.

Looking at the existing staffing pattern of the health units in Hagonoy, one can sadly note a pitiable ratio of one medical doctor to 46,065 individuals. There are only six (6) licensed nurses, 12 midwives, 2 sanitary inspectors, 1 dentist and one medical technologist to serve the whole municipal populace. This case presents a very deplorable ratio when compared to the national standard ratio of one doctor per 20,000 population.

While the presence of Barangay Health Workers (BHWs), Barangay Nutrition Scholars and other Health Workers augment the very lean professional health staff, there is a need to strengthen the training of health worker volunteers who are frontliners in their respective barangays. Volunteerism might be welcomed best when the health workers are inadequately trained their clients' well-being or even life could be compromised.

Chapter Summary:

The municipality of Hagonoy is basically an agricultural area with favorable soil and climate for agriculture. Its people depend on its agricultural products for food and livelihood. Major livelihoods include farming and fishing. Its population growth rate rose in the 80's but slowed down in the nineties until today. High literacy rate may partly explain the decreasing growth rate.

Table 11. Sufficiency level (%) of **rice** in Hagonoy, Davao del Sur: 1997 – 2000

	1997	1998	1999	2000
Hagonoy	291	371	416	414
Davao del Sur	101	120	128	127

CHAPTER 2

THE STRUCTURE OF AGRICULTURE

Both the province of Davao Del Sur and the municipality of Hagonoy are predominantly agricultural areas. Favored with a mild tropical climate, relatively good soil and abundant water supply, they have an advantage for the cultivation of various crops, aquaculture, and fishery products. For many years now, they have produced a considerable surplus on major crops such as rice, corn, and bananas.

1. Land use

A. Provincial Context

Davao del Sur may be classified as an agriculture-dependent province, Almost fifty percent (44.88%) of the total land area of the province is devoted to agriculture production (*Figure 9*). Of the total land area devoted to agricultural crops, coconut occupied 50.99 percent.

Grassland, as one of the special land uses in the province, occupied about 30% of the total land area or 118,494 hectares. The existing forestland has a total area of 83,734 has or 21 percent of the total provincial area. The municipality of Jose Abad Santos has the largest forest area of 27,730 has or 33 percent of the total forestland use of the province.

Windows Media Player.Ink The province has a total built-up area of 7,306 has or 1.86 percent of the total land area.

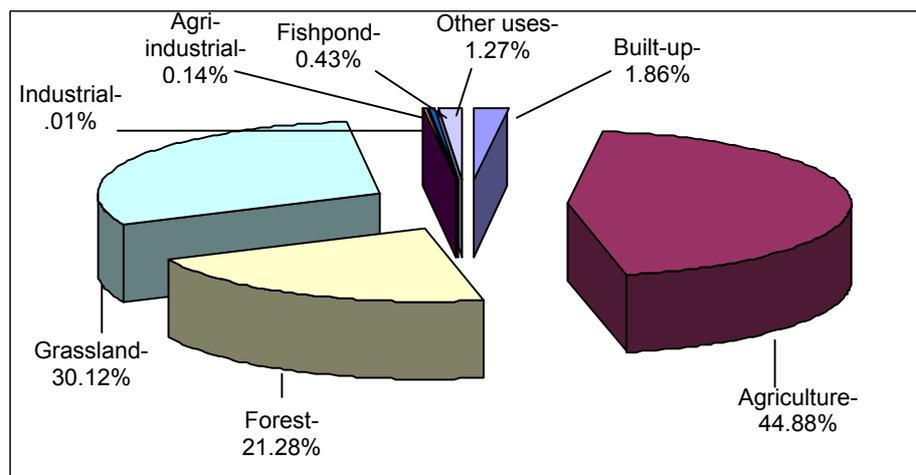


Figure 9. Existing general land use in Davao del Sur

b. **Municipal Context**

All the land within the territorial limits of the municipality is classified as alienable and disposable. A greater portion of the total land area of 10,479 hectares or 89.84% is devoted to agriculture production (*Figure 10*). The eastern barangays are covered mostly of plantation type crops. The predominant crops are coconut, bananas, mango and sugarcane. The centrally located barangays are within the service area and coverage of the Padada (Hagonoy) River Irrigation System (PRIS). These areas are considered as prime agricultural land being planted to irrigated lowland rice. The municipal LGU has declared these areas as non-negotiable and non-convertible for non-agricultural uses to ensure food security and sustainability of rice as flagship industry of the municipality relative to the Malalag Bay Alliance-Provincial Agri-Industrial Center development. The western upland barangays are utilized for sugarcane, coconut, corn, mango and bananas.

The built-up area of the municipality is about 501 hectares or about 4.30 percent of the total land area. This comprises the barangay centers where the residential, commercial, institutional, recreational, and infrastructure facilities and utilities are clustered.

The municipality has no land area devoted to forest, grassland, and tourism. However, the fishpond area in the municipality is 380 hectares, the widest fishpond area in the province. Land for other uses totaled to 304 hectares which includes road network, dump sites, cemeteries, rivers and creeks, parks and playgrounds, quarry, etc.

The area devoted to commercial plantation crops along the 1,000 meter-strip on both sides of the national highways on the south was classified as agro-industrial zone. This area is about 317 hectares or 2.55% of the total municipal land area. Located on this area are the big agro-industrial establishments like the subsidiaries of the La Panday Group of Companies (GADECO, LSVI and MVPI), the Cocoa Investors Incorporated and the Davao Sugar Central Company (DASUCECO).

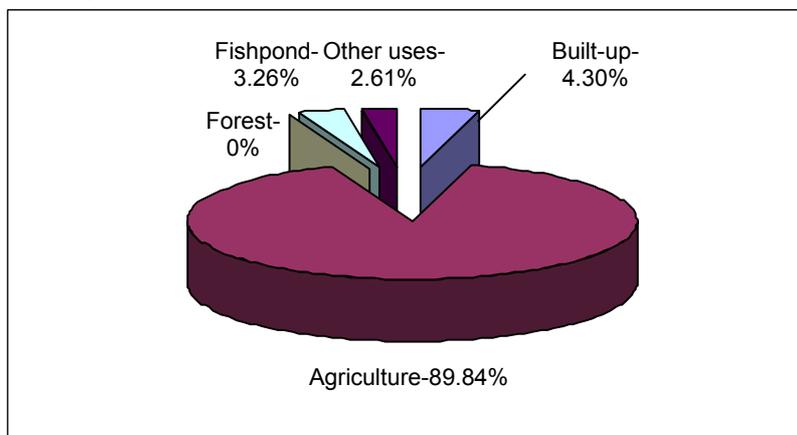


Figure 10. Existing general land use in Hagonoy

2. Land Tenure

a. *Provincial Context*

Davao del Sur. In land tenure, owner-operators still predominate in the province. About 70 percent are cultivating owners, followed by leasees (23%) and very few tenants (1%).

b. *Municipal Context*

Hagonoy, Davao del Sur. Based on a survey conducted among Hagonoy rice farmers in 2003, sixty five percent of the farmers interviewed were owner-operators. Some (23.2%) were leaseholders. Only one respondent (1.0%) was a tenant farmer or shareholder who usually pays his landlord a significant proportion of his harvest.

Table 11. Tenure status of farmers in Hagonoy, Davao del Sur.

Category	Frequency	Percentage
Owner	73	65.2
Leasee	35	31.3
Tenant	1	0.9
Farm Worker	3	2.7

Source: “ An Early Assessment of F₁ Hybrid Rice Adoption in Davao del Sur,” 2003

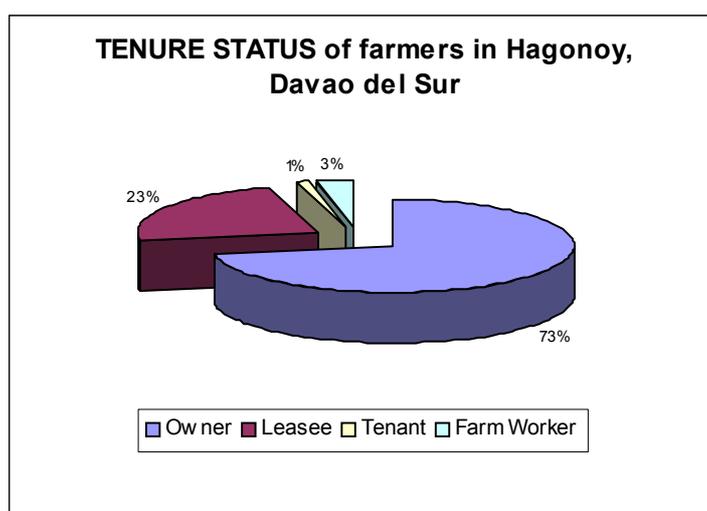


Figure 11. Tenure status of farmers in Hagonoy, Davao del Sur

3. Opportunities and constraints to productivity in major crops

Of the total area devoted to agricultural crops in the province, coconut gets 50 percent and the other crops share the remaining areas. Top grosser of more than one billion pesos each in production value are: banana for exports, coconut, mango and rice.

Meanwhile, in Hagonoy the major agricultural crops are coconuts, rice, sugarcane, banana and mango. Their top priority in pursuing agriculture modernization is food security.

3.1 Coconut

Over the past three years (2000-2002) in Davao del Sur province, there was a slight increase in the total land area for coconut due to some physical adjustments of coconut land area in some municipalities. However, total provincial average production of coconut dropped by one percent due to rampant felling of coconut trees for lumber use. Relatively low market price aggravated by price fluctuations of copra constitutes the coconut farmers major problems.

In Hagonoy, coconut remains the leading agricultural crop. It has been cultivated since the 19th century and has been the key factor in bringing material growth to the municipality all through the years until world coconut prices sank, first in the mid-70s and then in the early 80s.

Since 1997, coconut production was slowly recovering from the disastrous period of the mid-80s when limited investments, declining domestic demand and fall in international market prices resulting in reduced production and exports. This positive development occurred despite decrease by about 100 hectares in three years because of the conversions into other high-value economic crops such as corn, mango, banana and sugarcane. As of crop year 2004, 5.25 MT per hectare of coconut was produced in Hagonoy, Davao del Sur.

In all the 21 barangays of Hagonoy, coconut is the most popular crop grown. It covers about 3,247.34 hectares having an average yield of 2,500 kilograms per hectare. The most productive and large coconut plantations are located in the central and eastern barangays. In recent years however, coconut areas have been drastically reduced due to massive cutting of coconut trees. Reasons given by key informants include change of crops and conversion of the coconut farms into non-agricultural lands. For instance, the Cocoa Investors Incorporated (CII) coconut cum cacao plantation of more than 900 hectares has been converted into mango plantation. Also a number of coconut plantations gave way to the expansion of the Lapanday Group of Companies for their banana plantations and the Filinvest Farm Corporation for their sugarcane plantation.

Evidently, coconut plantation areas have tremendously decreased from an estimated 4,720 in 2000 to about a little over 2,000 hectares in 2002-2004. Change of crop-from coconut to mango, sugarcane or banana accounts for the main reason of the massive cutting down of coconut trees. Added to this are the need for coconut lumber in house and other buildings construction and the plan of some coconut landowners to convert said areas into non-agricultural uses.

Table 12. Area planted to coconut and production, Hagonoy, Davao del Sur: 2001-2004

	2001	2002	2003	2004
No. of farmers	614	614	610	610
Area planted (ha)	2151.19	2038.45	2033.45	2033.45
Area harvested (ha)	1763.88	1723.88	1740.00	1750.00
Production (MT)	3783.031	37235.87	32880.00	36750.00
Ave. yield/ha (MT)	5.36	5.4	5.5	5.25

Source: OMAG Report, Hagonoy, Davao del Sur, 2001-2005

3.2 Rice

In 2004, the total agricultural land area devoted to agricultural crops in Davao del Sur was 195,780.97 or an equivalent to 49.8% of total land area of the province. Total irrigated area in the province planted to rice is 12,645.53 hectares and the potential irrigable area is 15,719 hectares.

The total land area planted to rice in 2004 was 26,584.54 hectares or 11% of the total land area devoted to agriculture covering ten (10) municipalities of which 25,050.79 hectares are irrigated and 1,533.75 hectares are rainfed or upland. The total annual production of rice was 147,006.95MT with two (2) croppings per year or about 7.5% higher than that of 2001. Average yield/hectare for irrigated rice was pegged at 5.78 metric tons and 1.46MT for rainfed/ upland area.

Among the rice growing municipalities in the province, Hagonoy consistently recorded the highest average yield of 6.96 MT/ha closely followed by the municipalities of Magsaysay and Matanao that registered 6MT/ha and 5.59MT/ha, respectively. Increment in the average yield was attributed to the integration of improved farming-technologies particularly the adoption of synchronous planting technology and the Balanced Fertilization Strategy. Correspondingly, intensified use of hybrid and certified seeds as planting materials and the infusion and operation of additional farm machineries and equipment also contributed favorably to its increment. Moreover, provision of agricultural facilities and other related services on the ground are facilitating factors. Moreover, provision of agricultural facilities and other related services on the ground also contributed to the increased yield per hectare thereby increasing the income of the farmers.

Rice production and sufficiency levels in Hagonoy are likewise high. But shortage is observed especially during mid-planting and harvest seasons. In fact, rice requirements of big agri-based industries are sourced out from other provinces. Marketing opportunities, insufficient warehousing and processing facilities may cause the exportation of fresh palay from Hagonoy Traders and palay buyers from outside the municipality offer higher price than those from within. While it is true that several viable cooperatives engage in agri-trading activities, lack of capital and facilities limit them to absorb large volume of palay. As a result, farmers immediately sell their produce directly to the traders right after harvest even at a lower price to prevent spoilage and further deterioration of their produce. In such situation, farmers are freed from the rising interest rates of the money they had borrowed from local financiers. It may be worthy of note that a good number of farmers are dependent on traders and input suppliers for their production capital and food during lean months.

Records show that inbred and hybrid rice gave good yields in 2003 but both dropped in 2004 due to prevalence of rainfall favoring the onset of pests and diseases. Expectedly, farmers withhold their investments the next cropping; thus, hybrid rice adopters also decreased. But in 2005, it appears that the yield performance of inbreds including IR 64 was lower than that of the hybrids. The rice tungro virus infection was more prevalent among IR 64 plants than those of hybrid rice varieties.

Table 13. Rice area planted, production and average yield per hectare in Hagonoy, Davao del Sur, : 2001 – 2005

	2001	2002	2003		2004		2005	
Irrigated lowland			Inbred	Hybrid	Inbred	Hybrid	Inbred	Hybrid
No. of farmers	1436	1470	1470		1470	785	1470	369
Physical area (ha)	2046	2192.81	2192.91		2192.91	931	2192.91	
Area planted (ha)	2046	2192.81	2192.91		2192.91	931	2192.91	
Area harvested (ha)	2046	2192.81	2192.91		2192.91	931	2192.91	
Production (MT)	24347.4	30542.9	34783.25		19191.87	3676	19415.25	
Ave.yield/ha (MT)	5.95	6.96	6.20	8.58	4.20	4.76	4.37	6.33

Source: OMAG Report, Hagonoy, Davao del Sur, 2001-2005

About two-thirds of the farmer-respondents in a survey conducted in Hagonoy preferred to use IR 64 (Table 14). These same farmers were easy to convince to try using hybrid rice varieties because they were used to buying certified seeds. Under a government seed subsidy program, the price of hybrid rice seeds for 20 kg comes closer to the price of the 40 kg certified seeds. One reason for farmers' shift hybrid rice is the slackening support for inbred rice production which resulted to limited production of inbred seeds (whether certified or registered). The small inbred seed producers have complained about market of their produce since there was so much support given to hybrid rice use all over the country. Without source of certified seeds, farmers resort to using hybrid rice.

Table 14. Inbred rice variety used prior to hybrid rice and their corresponding yield, November 2002.

Category	No. of users		Yield of inbred rice variety prior to hybrid (cav/ha)									
	f	%	<100		101-120		121-140		141-160		161 above	
			F	%	f	%	f	%	f	%	f	%
IR-64	78	69.6	8	10.3	22	28.2	32	41.0	14	17.9	2	2.6
IR-74	6	5.4	1	16.7	2	33.3	2	33.3			1	16.7
IR-23	2	1.8	2	100.0	-							
Daluson	1	0.9	1	100.0	-							
PSB Rc-10	4	3.6	1	25.0	-		1	25.0	1	25.0	1	25.0
PSB Rc-74	21	18.8	7	33.3	3	14.3	5	23.8	4	19.0	2	9.5
Total	112	100.0	20	17.9	27	24.1	40	35.7	19	17.0	6	5.4

Hybrid rice farmers may be characterized as males, less than 50 years old, having some secondary level of education, and owner-operators of the rice farm they cultivate (Table 15). While some women have reported managing hybrid rice farms, they remain a small sector.

Table 15. Socio-demographic characteristics of hybrid rice farmers in Hagonoy, Davao del Sur, November 2002.

Category (n=112)	Frequency	Percentage
1. Sex		
Male	75	66.7
Female	37	33.3
2. Age		
61 and above	23	20.5
51 – 60	33	29.5
41 – 50	36	32.1
31 – 40	17	15.2
30 and below	3	2.7
3. Education		
College level/graduate	24	21.4
HS level/graduate	49	43.8
Elementary level/graduate	39	34.8
No formal education	-	-
4. Tenure status		
Owner	73	65.2
Leasee	35	31.3
Tenant	1	0.9
Farm worker/labor	3	2.7

Table 16. Mungbean area planted, production and average yield per hectare in Hagonoy, Davao del Sur, : 2001 – 2004

	2001	2002	2003	2004
No. of farmers	620	550	500	400
Physical area (has.)	1100	970	900	800
Area planted (has.)	1100	970	800	800
Area harvested (has.)	1100	970	800	800
Total production (MT)	1,100.00	1,261.00	960.00	1,040.00
Average yield/ha (MT)	1	1.3	1.2	1.3

3.3 Banana

Banana is considered as one of high economic value commodities that are exported. As such, it is a dollar earner that helps much the country's economy. Banana production in the province ranked 7th in 1991 and rose up in 2000 as the 4th in terms of area cultivation. In 2002, the total area planted to banana with different varieties was 12,370.92 hectares with a total production of 220,467.06 MT and average yield of 18.52 MT/hectare. Banana is traded locally and outside of the province. Banana produce of the province reaches as far as Japan and Korea for Cavendish variety. Banana for export shares 18% of the total production.

In 1995, the total harvested area in Region XI was 43,600 hectares, producing 1.64 million tons of banana. In terms of productivity, however, Davao del Sur showed relatively high performance with an average of 62 tons/ha over the last seven years although it has been declining since 1994. Average yield per hectare of export bananas ranged from 50-56 MT/ha in 1997-2000.

The high productivity could be attributed to the fact that majority of production comes from plantations established on prime agricultural land with huge investments using advanced farming technology including variety selection, fertilizer application, pest control, irrigation, etc. Due to severe market competition in the world market, some plantations are now transferring to high-altitude areas to produce preferred fruits with shape and taste.

For three years, production area of local banana had an erratic trend from 12,845 hectares in 1999 to 13,112 hectares in 2000 and 12,505 hectares in 2002, and 9,607.05 hectares in 2002. This situation occurs because many farmers, after having planted banana in their farms for two to three years, abandoned them due to declining yields and pests and diseases. However, the recent establishment of banana processing plant in the province encouraged the farmers to improve their production to as high as 61,200.06 MT or with an increment of 10.9% from previous years' production.

Table 17. Davao del Sur 11-year banana production trend.

Year	LOCAL		EXPORT	
	Area harvested (has)	Production (MT)	Area harvested (has)	Production (MT)
1991	2,723.29	17,998.03	750.00	19,500.00
1992	2,742.40	14,032.50	1,290.00	50,074.00
1993	3,462.75	22,273.47	1,400.00	54,500.00
1994	3,497.00	24,199.22	1,400.00	56,800.00
1995	3,497.00	24,199.22	1,400.00	56,800.00
1996	4,158.00	13,966.00	1,615.00	113,922.00
1997	3,414.00	27,048.13	2,263.00	119,990.00
1998	4,330.08	37,763.76	2,275.00	121,194.00
1999	12,186.23	59,532.53	2,727.87	141,074.54
2000	12,742.22	49,085.69	2,723.87	154,101.50
2001	11,811.16	55,183.48	2,723.87	154,615.00

Production for local banana varieties has been limited to backyard type or planting along the property boundaries. Banana, as food supplement and/or substitute to staple food like rice and corn, can be processed into high valued commercial products, such as flour, banana chips, banana cracker, sauce and dried blossom. Banana chips are making headway into the international market. Problems confronting the local banana industry are lack of quality planting materials, high cost of production inputs, pests and diseases and lack of marketing system.

Meanwhile, in Hagonoy, Davao del Sur banana production particularly the Cavendish variety is intended for export abroad. As such, it ranks third in land area utilization in 1995. The banana plantations are located in the eastern barangays. The Lapanday Group of Companies which include the Guihing Agricultural Development Corporation (GADECO), Lorenzo and Sons Ventures, Inc., Malalag Ventures Plantation, Inc. and Kawayan Land Development, Inc. operates these banana plantations covering about a thousand hectares. Native banana varieties are also grown but mostly for home and domestic markets consumption.

Table 18. Area planted to banana, production and average yield per hectare in Hagonoy, Davao del Sur: 2001– 2004.

	2001	2002	2003	2004
Production for Local Market				
No. of farmers	247	247	271	305
Physical area (ha)	390.51	390.51	429	464.12
Area planted (ha)	390.51	390.51	429	464.12
Area harvested (ha)	385.51	390.51	429	440
Production (MT)	131.54	13296	15015	14520
Ave.yield/ha (MT)	34.12	34.05	35	33
Production for Export				
No. of farmers	3	3	3	3

Physical area (ha)	1656	1696	1696	1696
Area planted (ha)	1656	1696	1696	1696
Area harvested (ha)	1656	1696	1696	1696
Production (MT)	107640	112292	115328	11617640
Ave.yield/ha (MT)	65	67	68	68.50

Source: OMAG Report, Hagonoy, Davao del Sur, 2001-2005

In 1997, area planted to banana in Hagonoy reached 411 hectares and 1,015 hectares, for local and exports use, respectively. Native varieties had an average yield of 40.6 MT per hectare while the Cavendish variety had an average yield of 67 MT per hectare. The succeeding years found the native varieties yield fluctuating to a low of 40 MT (1998) and 34.02 MT per hectare in 2000. A slight decrease of 2 MT per hectare in average yield was also observed in the Cavendish variety in 1998 – 2000. Diseases as well as decreasing production of old plantations account for decreasing yields in both native and Cavendish varieties.

Decrease in area planted for local market was observed in 2001-2003 but slightly increased in 2004. On the export side, expansion of banana plantations was observed. Small banana producers do not have the luxury of technology access like the availability or access to tissue-cultured banana plantlets.

3.4 Sugarcane

Davao del Sur is one of the producers of sugarcane. Area planted to sugarcane in 2002 was 11,635.34 hectares with annual production of 554,664 MT that gives an average yield of 47.67 MT/hectare. Eleven out of the fifteen municipalities are sugarcane producers with Matanao having the biggest production area of 3,143.75 hectares. Following second is the municipality of Kiblawan with 2,792.56 hectares.

In 1999 - 2002, there was a decline in the area planted to sugarcane. From an area of 12,108 hectares in 1999, it went down to 10,880 hectares in 2001. A slight increase in area in 2002 was registered with an average production of 47.67 MT per hectare, still lower by 8.15% from 1999 yield per hectare. Poor feeder road conditions made transportation and production input costs high.

In Hagonoy, the expansion of the Davao Sugar Central Company in Guihing, Hagonoy, Davao del Sur has increased the production area of sugarcane in the municipality. Through the Filinvest Farm Corporation, a number of farmers leased their area for cultivation of sugarcane. The area expansion for sugarcane was meant to meet the milling capacity of the sugar mill for its continuous operation the whole year round. Large areas of sugarcane cultivation are however found in the neighboring municipalities particularly Kiblawan, Matanao, Sulop and Sta. Cruz.

Table 19. Sugarcane area planted, production and average yield per hectare in Hagonoy, Davao del Sur, : 2001 – 2004

	2001	2002	2003	2004
No. of farmers	429	579	500	558
Area planted (has.)	1594.35	1876.98	1509	1574
Area harvested (has.)	1594.35	1876.98	1509	1574
Total production (has)	111604.5	140774	116193	80274
Average yield/ha (MT)	70	75	77	51

Source:OMAG Report, Hagonoy, Davao del Sur, 2001-2005

There is an erratic trend in area planted as well as average yield per hectare for sugarcane production in Hagonoy. For instance, in 1997 area planted totaled 1,066.74 hectares with an average yield of 51.81 MT per hectare. In 1998, the area planted to sugarcane increased by almost a hundred hectares but production yield decreased to a low of 37.69 MT per hectare. Interestingly, area planted dramatically went down to 892.75 hectares in 1999 but production yield hit high with an average of 58.35 MT per hectare. This yield performance was not sustained the following year when its average yield went down to 46.8 MT per hectare despite the fact that production area rose to 1, 465.99 hectares.

3.5 Mango

Mango is one of the most popular tropical fruits in Davao del Sur found in all municipalities/city of the province. Mango planting in the province shows an average annual growth rate of 9.53% from 1996-2000. A tremendous increase in cultivation was felt from 318 hectares in 1991 to 3,930 in 1996 to as high as 9,592.18 hectares in 2001 having 35% bearing plants. As of 2002, Malita had the largest area planted to mango with 1,863 hectares or 18% of the total area planted in the province. But in terms of production, Malalag had the biggest share of 40% or 24,401.25 MT. The 6-year data shows a declining trend of average yield per hectare from 77.70 MT in 1996 to 14.21 MT in 2001. Throughout Region XI, Davao del Sur registers the largest production areas planted by province (BAS, 2002). It accounts for 56% of the total production area and 53% of the total volume of production in the region.

Fruits are sold in fresh form with a total production of 60,048.35 MT in 2002 with an average yield of 15.3 MT per hectare. Of the different varieties planted, 70% constitutes the Cebu/Carabao variety that had been exclusively planted in the entire province.

Mango fruits were sold to Davao City and other neighboring provinces, in Cebu and Manila and were even exported to the international market. Organized mango producers in the rural areas have ready access to market information and reliable marketing agreements, available appropriate production, standard harvest and post-harvest technologies wherein series of seminars and hand-on trainings' were conducted to produce quality fruits.

To boost the industry, Technology Demonstration Center was established where necessary techniques in mango processing along with other identified high value crops were demonstrated to help prevent post harvest losses and increase farmers income through value adding post harvest and processing operations. Moreover, postharvest and processing facilities like Hot Water Treatment Tank and Food Dehydrator in processing Mango were distributed to LGUs and cooperatives.

For three years (1997-2000), mango showed a significant increase in terms of area and production (*Table 20*). The total area planted of about 7,442 hectares in 1999 was increased to 10,067.71 hectares in 2002 or a positive average growth rate of 14% per year. Total production for 1999-2001 was likewise increase by 5% and 25% increment in 2002. This significant increase was attributed to additional area harvested of about 571.93 hectares.

However, the mango industry also suffered from low price in the market due to over supply of fresh fruits during peak season. Mango growers also need more training in mango production and post harvest technology. Absence of research center became one of the obstacles in the attainment of quality fruits that could compete in the international market. Likewise, absence of mango processing plant also reduces the opportunity of mango growers to processed fresh fruits into its by products thus creating more job opportunities and more income.

Table 20. Davao del Sur 6-year mango cultivation trend.

Year	Total area planted (has)	BEARING		
		Area harvested (has)	Total production (MT)	Average yield (MT/ha)
1996	3,930.00	393.00	30,529.00	77.70
1997	4,191.34	996.09	41,081.30	41.20
1998	4,755.65	1,659.42	57,054.29	34.40
1999	7,442.83	2,546.98	43,576.92	17.11
2000	8,480.18	2,659.62	45,210.88	17.00
2001	9,592.18	3,347.46	47,682.67	14.24

In Hagonoy, area planted to mango increased in 1999 when compared to previous years (*Table 21*). Average production yield on a hectare basis, however, dramatically decreased from 50 MT per hectare in 1997 to 5.0 MT per hectare in 1998. While average yield again rose in 1999 to 14 MT per hectare, it is still far from the average yield recorded in 1997. Several factors account for the yield decline despite increase in area planted. The prevalence of pests and diseases and erratic weather condition make it difficult for farmers to produce high yields. Harder still is for them to produce quality mango fruits.

Table 21. Area planted, area harvested, production and average yield of mango, Hagonoy, Davao del Sur, 200-2004.

	2000	2001	2002	2003	2004
No. of farmers	156	161	181	483	487
Physical Area (has.)	947.29	1052.29	1072.29	1185.59	1191.59
Area Planted (has.)	947.29	1052.29	1072.29	1185.59	1191.59
Area Harvested (has.)	187.29	200.29	600.29	673.07	773.07
Total Production (MT)	2648.81	3004.35	9604.64	11442.19	12369.12
Average Yield/Ha (MT)	14.14	15	16	17	16

3.6 Livestock and Poultry

The major livestock raised in the province included cattle, carabao, hogs, goat/sheep and horses. In the 2002 inventory, only hogs attained an increase of about 1,757 heads as against the 2001 data. All other species declined in terms of production. The decrease in production was brought about by the persistent drought that hit the province from year 1999 up to the year 2000 and the endemic occurrence of animal diseases that affected ruminant animal. Farmers were force to dispose their raised animals due to scarcity of feeds and at the same time to augment their living.

Meanwhile, poultry production continues to grow by an average growth of 22.77 percent from the year 2000 up to the year 2002. Poultry population accounted 1,668,667 heads in the year 2002, a remarkable increase of 560,745 heads as compared to the 2001 data. One factor that contributed to this positive undertaking is the on-going implementation of the Barangay Empowerment and Networking (BEN) project through the Provincial Veterinary Office (PVO) wherein a one (1) month-old kabir chicken were dispersed to qualified farmer/beneficiary.

With regard to the supply of livestock and poultry meat for the year 2002, the province posted a total of 18,618 metric tons of pork, 2,497 metric tons of beef/carabeef and 1,668 metric tons for poultry meat.

Table 22. Actual livestock/poultry population in Davao del Sur, 2000-2002.

Animal	Actual population		
	2000	2001	2002
Carabao	47,145	49,559	27,130
Cattle	36,750	51,411	34,158
Goat/Sheep	121,316	129,968	92,847
Swine	383,944	363,296	365,053
Horse	25,928	28,944	14,120
Poultry	1,058,638	1,107,922	1,668,667

Source of Raw Data: PVET

Based on stated assumptions, the province falls short of beef/carabeef and poultry meat. Despite the increase production in poultry, poultry meat cannot cope up the food requirement of the fast growing population of the province. However, big commercial raisers from neighboring cities like Magnolia Chicken, Swift and Nenitas Farm supplemented these inadequacies of supply.

With this situation, there is a need to intensify the on-going chicken dispersal in order to be self sufficient in poultry meat. Moreover, Animal Health Care and Disease Management should be strengthened to combat possible occurrence of prevalent diseases.

In year, the supply of pork is more than enough to meet the demand of the provincial populace posting a surplus of 12,985 metric tons of pork meat. On the other hand, beef/ carabeef is not enough to cater the demand of the populace as a deficit of 1,056 Metric tons was registered in 2002.

Chapter Summary

The municipality of Hagonoy just like Davao del Sur has five (5) major crops: coconut, rice, banana, mango and sugarcane. But agro-industries have focused on banana, mango and sugarcane. Based on rice production yield, Hagonoy registers as one of the highest in average yield per hectare in Mindanao at 6 t/ha. Expectedly, high sufficiency level in rice has been achieved in Hagonoy. However, the proximity of this town to Digos City where most of the rice traders are located has prompted many of the rice farmers to obtain their production loans from them and sell much if not all of their produce at harvest. Given this situation, some farm families experience rice shortage when the rice crop is still at reproductive stage.

Table 23. Temporary Crops – Number of farms reporting and area planted by kind of temporary crop in Hagonoy, Davao del Sur: 1991.

CROPS	Number of farmers reporting		Area planted	
	Davao del Sur	Hagonoy	Davao del Sur	Hagonoy
Palay	23,319	1,512	35,801	3,810
Corn	68,764	1,586	116,885	2,614
Cassava (camoteng kahoy)	21,415	322	1,438	2
Eggplant (talong)	28,058	1,558	273	70
Squash (kalabasa)	10,278	454	222	4
Tomato (kamatis)	11,271	396	327	1
Peanuts	2,707	29	632	1
Sugarcane	5,426	290	5,883	413
Mongo, dry	4,687	845	1,853	861
String beans, harvested green (sitao)	15,918	512	201	1
Wax gourd (kondol)	149	14	1	-

CHAPTER 3

SUPPORT SERVICES TO RICE FARMING: ARE FARMERS' NEEDS ADEQUATELY MET?

The province of Davao del Sur is considered one of the major rice producing provinces of Region XI. It has been regarded as Mindanao's top rice yielding province because of its municipality's (Hagonoy) high yield performance. Hagonoy's average rice yield of more than six tons per hectare has consistently been higher than the provincial average of a little more than five tons per hectare, both of which are higher than the regional average of more than four tons per hectare.

Rice farmers in Davao der Sur have a total number of 9,390, most of whom are owner-cultivators with an average farm area of 1.8 hectares. In Hagonoy, some 1,436 farmers who are also mostly farmer-cultivators are actively engaged in rice farming over a total rice area of 2,046 hectares. Most of the rice farmers (98%) in the province grow rice in irrigated lands while in Hagonoy, 100%.

Rice farmers in irrigated lowlands, whether in the province or specifically in Hagonoy employ rice-rice cropping pattern while some 20% do rice-rice plus other crops (either legumes or watermelon). The popular practice of crop establishment is the transplanting method. Interestingly, progressive farmers in the province but more especially in Hagonoy have hosted technology demonstrations or trials by government agencies or private companies. The technology demonstrations usually focused on the use of new varieties, inbred or hybrid and new fertilizer, combined use of organic and inorganic fertilizers, or pesticide products for Fertilizer and Pesticide Authority (FPA) registration. Hence, these experimenting farmers have helped promote the use of certified seeds, F1 seeds, as well as new organic and inorganic fertilizers.

In Hagonoy, perceptions of important opportunities and constraints in the irrigated rice production sector have been gathered through informal field discussions, surveys and secondary reviews. The discussions highlighted farmers' access to agricultural service, public or private.

A review on World Bank papers has revealed the support services found to improve agricultural total farm productivity. These are: research and development, technology and extension, financial service, marketing infrastructure, water resources management, health and nutrition, population management and community organizations.

1. Research and Development

Farmers rely heavily on technological development by the public sector—the Philippine Rice Research Institute (PhilRice), and Bureau of Soils and Water Management, and almost always in collaboration with the DA—regional field unit XI. In some cases, research and extension activities done by PhilRice are in partnership with the University of Southern Mindanao.

Action researches done by the Office of the Municipal Agriculture are usually done either by DA-PhilRice or the BSWM. On-farm researches focus on varietal performance and balanced fertilization. Pockets of efficacy trials on new pesticides and fertilizers for Fertilizer and Pesticide Authority (FPA) carried out by private companies. With the advent of hybrid rice in 1998, private seed companies like Monsanto (Maguilas 500) Bayer (Crop Science, Bigante) became visible in the field.

While Hagonoy rice farmers seem to be excited about new varieties, fertilizers and pesticides, they reported some degree of dissatisfaction on newly released varieties, inbred or hybrid on their susceptibility to pests and diseases and poor milling recovery. Asked about their varietal preferences, they reported traits of IR64, an inbred variety which they have held for more than two decades now. IR64 or popularly known in the area as “seven-tonner” has very high market acceptance due to its high milling recovery and very good eating quality for cooked rice.

Table 24. Sources of research initiatives: Hagonoy, Davao del Sur.

AGENCY	Varietal Adaptation Trial		Fertilizer Efficacy		Pesticide Efficacy	Farm Machinery
	Inbred	Hybrid	Org	Inorg		
Public						
DA-PhilRice	x	x				x
DA-BSWM			x	x		
SUC (USM)	x	x				
Private						
Seed Companies		x				
Pesticide/Fertilizer			x	x	x	
NGO/cooperative			x			

2. Technology extension and advisory services

In Hagonoy, rice farmers developed a penchant for testing new technologies, from varieties to machines. They welcome information that will ensure increasing yields or stability of their average production yield of 6 tons per hectare.

Promotion of rice production technologies (hybrid) was carried out jointly or separately by the agricultural extension workers from the provincial and municipal agricultural offices as common activities. In unpublished research report (Hondrade, 2003), it was stated that farm and home visits by subject matter specialists (SMS) from the provincial office and agricultural technologists (ATs) from the municipal office were carried out regularly monthly. This finding was corroborated by the study of Cortado (2004) and validated in a focus group discussion with farmer leaders from Brgy. San Isidro and Sinayawan, Hagonoy, Davao del Sur. Inbred rice promotion was jointly or separately done by the ATs and the cooperative informal leaders that provide production loans to farmers (Figure 12).

Additional activities for hybrid rice promotion done regularly every cropping season included: technical briefings, seminars on F₁ rice technology, technology demonstration on F₁ rice, farmers formal dialogues and putting up of billboards. Farmer leaders have acknowledged these activities to be important for new adopters and farmers with equivocal feelings towards hybrid rice use.

Among the activities carried out irregularly during the year (wet or dry season) are: field days, radio program, printed materials, hand-outs, and provisions of free seed kits. Activities done irregularly monthly are: farm visits to technology demonstrations and follow-up visits for technical advice. Surprisingly, farmers observed ATs and SMS on motorbike doing weekly field monitoring.

Table 25. Extension strategies and activities as program support to the promotion of the F₁ hybrid rice technology in Hagonoy, Davao del Sur, 2002-2003.

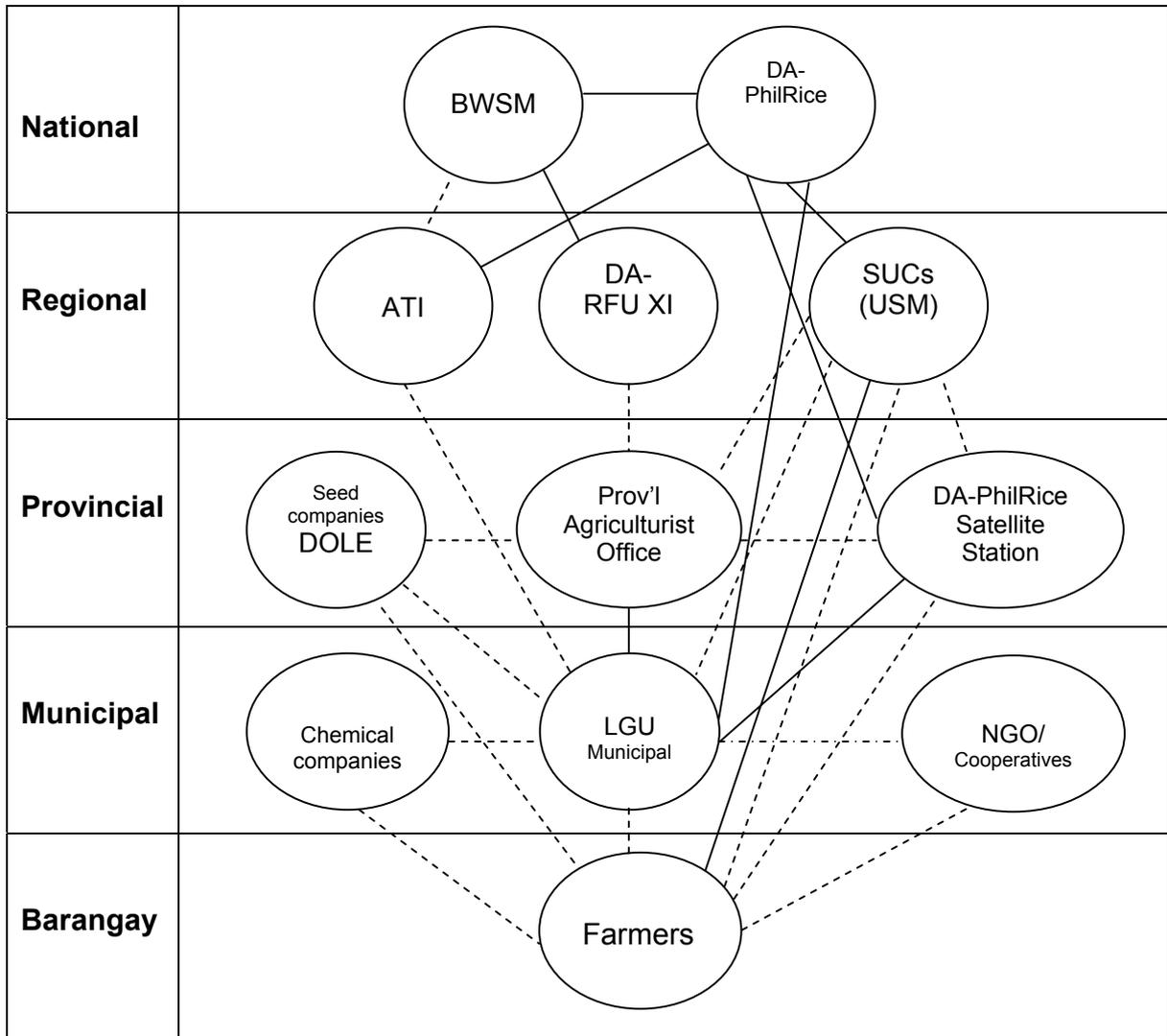
Extension/Activities/Strategies	OPAG DavSur	OMAG Hagonoy
Technical briefing	3	3
Seminar on F ₁ rice technology	3	3
Techno demo on F ₁ rice	3	3
Visit to techno demo	4	4
Farmer forum/dialogue	3	3
Hybrid rice field days	5	5
SMS/ATs home visits	2	2
Radio Programs	5	5
Billboards (at demo farms)	3	3
Printed materials/handouts	5	5
Free seed kits	5	5
SMS/ATs follow up to tech advice	4	4
Field monitoring/early warning device	1	1

Source: Hondrade, RFD. 2003. "Early Assessment of F₁ Hybrid Rice Utilization in Davao del Sur."

Legend:	1	-	Weekly
	2	-	Regular monthly
	3	-	Once per cropping season
	4	-	Irregular monthly
	5	-	Irregular yearly

From the series of meetings with farmers groups and the OMAG staff of Hagonoy, research initiatives generally comes from the PhilRice. On-farm tests on balanced fertilization in rice farming, however, take encouragement from the BSWM.

Evidently, on-farm researches on rice have been inspired by national agencies in partnership with the regional field unit of the Department of Agriculture and the provincial agriculture office. The OMAG reports very little involvement in the planning stage as national agencies generally seeks out the provincial LGU through the OPAG. Strong involvement of the OMAG lies on the identification of farmer-partners and monitoring on-farm trials. Whenever needed, the agricultural technician/s assigned to the barangay/s where the on-farm trials are located act as the OMAG's representative in the planning of on-farm trials initiated by national agencies.



Legend:

- Research
- - - - - Extension

Figure 12. Rice production technology path from resource community to user community in Region XI.

3. Other Support Services

Other support services categorized as: credit, communication infrastructure (roads), palay price negotiations and other assistance from the provincial and municipal LGUs, have been documented and confirmed by farmer leaders.

Credit. This support service through a government financial institution has been accessed by rice farmers through their cooperatives. For cooperatives which perform poorly in collecting payment for production loans availed of by their members, credit extended by GFIs like Quedancor cannot be accessed until such time when all past due loans are paid. In Hagonoy, very few cooperative has qualified to access this credit support for farmers.

Given this situation, farmers are left to fend for themselves. They look for informal credit institutions also known as “loan sharks” that impose very high interest rates on their production loans. This explains why farmers may have high production yield but the “loan sharks” to whom they are indebted are usually big rice traders/millers that buy all their produce. Hence, the farmers may be able to buy their household rice needs at harvest until a few weeks but will never last until next harvest season.

Communication infrastructure. Roads that connect rice farmers to market are all weather road except for some few areas. Although not paved, farm to market roads are maintained by municipal LGUs to allow traders to buy farmers produce at farm gate. At least, farmers no longer worry about hiring trucks that will transport their produce to market. But better still, farmer cooperatives that have invested in hauling trucks have found it much easier to collect farmers’ produce as payment for their production loans.

For information technology, the OMAG and a couple of its farmer cooperatives have invested in buying computers for word processing and record keeping. The OMAG and a few cooperatives have hoped getting an internet connections in the near future to facilitate access to information that will help address farmers’ problems.

Market support. For a long time now, rice farmers in Hagonoy enjoy an additional one peso per kilogram of IR 64 (“seven-tonner”) fresh palay marketed. Rice traders in Hagonoy and the neighboring city of Digos have preferred IR 64 over other inbreds because of its high milling recovery of more than 65% and consumers’ preference for its good eating quality of cooked rice. Of course, farmers prefer to plant IR 64 because of its high yield performance and higher market price tagged even by local traders. However, with the introduction of commercial hybrid rice farmers started using F1 hybrid seeds preferably the PSB Rc 72H because of its high yield performance and good eating quality of cooked rice plus aroma. The local government represented by the Office of the Provincial Agriculturist took the lead in developing market for the new hybrid rice. Local traders have been invited to a taste test and eventually the traders after scrutinizing the shape of the new hybrid which resembles that of IR 64 were convinced to make the buying price of PSB Rc 72H the same as that of IR 64. This situation helped promote the planting of the new hybrid in Hagonoy.

As earlier mentioned, the advent of commercial F₁ hybrid rice production in Hagonoy paved the way to more support to adopters. Incentives to using hybrid

rice seeds include seed subsidy amounting to a little more than half the price per 20 kg if paid in cash, technical advice, access to credit, and market assistance (Table 26).

Table 26. Other support services to F₁ hybrid rice production in Hagonoy, Davao del Sur, 2003-2004.

Support activities	Response	People linked with	Description of process
Support to seed production	Yes	Seed growers, PhilRice, DA, Banks, Cooperatives	Briefing and distribution of inputs
Support to seed delivery	Yes	DA, Cooperatives, PhilRice	Coordination
Support to assurance of seed quality	Yes	DA, Cooperatives, PhilRice, Seed growers	Testing and labeling
Facilitation of credit with local banks/coop	Yes	Provincial and local banks/Quedancor, Cooperatives	Coordination
Facilitate maintenance of irrigation facilities	Yes	NIA and other systems	Coordination
Facilitate maintenance of solar driers	Yes	Barangay officials and prov'l and mun'l engineers	Coordination
Dialogues with traders to raise price of F ₁	Yes	LGU officials, traders	Conference
Price negotiations for F ₁	Yes	LGU officials, traders	Conference
LGU support by assigning F ₁ rice coordinator	Yes	MAO, AT, farmers, PAO	Special order
LGU support by organizing F ₁ rice action team	Yes	LGU officials, farmers	Special order
LGU support by providing loans to farmers	Yes	Mayor, SB, Treasurer	Fund provision through SC resolution

Table 26 presents the activities under each category as follows: seed system in the form of support to seed production, support to seed distribution and delivery, support to ensure seed quality; credit in the form of facilitation on credit with local banks and cooperatives; infrastructure in the form of facilitating the maintenance of farm-to-market roads, facilitation in the maintenance of irrigation facilities, facilitate maintenance of solar driers; market support in the form of dialogues with traders to raise prices of F₁ hybrid rice, price negotiations for F₁ hybrid rice; and support from local government units in the form of assigning F₁ rice coordinator, organizing F₁ rice action team, and providing loans to farmers.

As can be gleaned from the table all those activities were carried out jointly and in some cases separately by the provincial agricultural offices, municipal agricultural offices and the local government units. Some local government units provided loan support to F₁ rice adopters through their appropriations.

The conduct of those activities involved many stakeholders in the form of linkages with the following: farmers, seed growers, banks, cooperatives, millers, traders,

barangay officials, PhilRice, the Department of Agriculture, the provincial and municipal agricultural offices, the National Irrigation Administration, provincial and municipal engineers, mayors, sangguniang bayan members, provincial and municipal treasurers. The conduct of those activities were in the form of: briefings, seed labeling, coordination with other agencies, conferences, special orders and enactment of ordinances on funding loans for F₁ rice farmers

When asked about the support services which farmers enjoy whether they plant hybrid or inbred rice seeds would range from access to market, labor, irrigation water, and credit. Their opinions gathered through a survey confirm what the municipal agriculturist and ATs revealed during a focused group discussion with them. Market access to farms means traders could readily bring their hauling trucks to farmers' fields.

Interestingly, more than half of the farmers surveyed reported accessing production loans from their cooperatives, local traders, banks and Quedancor. A good number of farmers have reported self-financing their own farming activities, an indication that some rice farmers in Hagonoy have the resource capacity to manage rice farms. It was reported that this group of farmers primarily owns the farms. Those that access loans from the cooperatives and traders are mostly tenants or leasees.

Table 27. Farmers' opinions on support services to rice farming in Hagonoy, Davao del Sur, 2003.

Support Services	N = 140	Davao del Sur %
1. Farm Accessibility to Market		
Yes	132	94.3
No	8	5.7
2. Availability of Labor		
Yes	138	98.6
No	2	1.4
3. Source of Irrigation		
NIA	133	95.0
Non-NIA	7	5.0
4. Farm Drainage Access		
Yes	139	99.3
No	1	0.7
5. Availability of Credit		
Yes	140	100.0
No	0	0.0
6. Source of Production Capital		
Self-financed	59	42.1
Loan	81	57.9
Cooperative	(35)	
Traders	(25)	
Bank	(5)	
LGU	-	
Quedancor	(16)	

Understanding the rice supply chains in Hagonoy

A supply chain is a network of organizations contributing to the design, production and distribution of a product from its inception to its consumption by the final consumer. In looking at the management of a rice supply chain, one observes the coordination and control of all activities from production to the consumer or from farm to plate. Efficient rice supply chain management has the goal of maximizing values through lower transaction costs and improved grain quality.

Activities, needs and information flow among the chain actors and stakeholders affect the livelihoods and well-being of many different groups of people. Most obviously, an improved management of the chain affects the different actors in the chain itself, and especially those most dependent on the product, including producers, processors, and traders. It also affects those actors who provide services to the chain, including input suppliers, organized farm workers, farm equipment and machinery manufacturers or fabricators, credit providers as well as research and extension institutions.

More organized and efficient rice supply chains in Hagonoy are not an end in themselves but a means to enhancing the benefits derived from participation in those chains.

Who are the stakeholders and actors? What are their needs?

Participants in the rice supply chains in Hagonoy, Davao del Sur include the following:

a. **Purchased inputs.** In rice production, critical inputs include seeds, fertilizers, pesticides, technical information, farm machines and animal (carabao), labor, capital (farmers' own and loan), and irrigation water. For rice seeds, inbred and hybrid rice seeds have their own producers and suppliers. Whether hybrid or inbred, seed producers usually link with the local government units' agricultural services and farmers' cooperatives to facilitate distribution. Without government seed subsidy, seed producers especially the small ones find it difficult to sustain seed production business. Agriculture chemicals suppliers have established distribution channels to reach farmers in the rural areas. They usually employ their own technicians to promote their products to farmers as well as educate them on proper handling. In Hagonoy, farm labor is provided by either or both the family and hired labor. There is however an increasing demand for organized hired labor that provides planting cum harvesting services. Irrigation water is also a critical input in that farmers cannot time their planting unless water is made available by National Irrigation Administration, the DA-attached agency in charge of irrigation water management. Most important of all, for resource-poor farmers who depend on loan for their production inputs availability, their access to credit through formal and informal institutions is very important. There is a growing interest of credit institutions to impose rice technologies especially the use of registered or certified seeds ensure successful harvest and high loan repayments. In fact, farmers' cooperatives require their members to use recommended varieties whether inbred or hybrid.

Table 28. Input use pattern for the production of inbred and hybrid rice in Region XI, 2003.

Input Use	Hagonoy	
	Inbred	Hybrid
Seeds (kg/ha)	68.46	20.00
Fertilizers (bags/ha)		
Organic (bags)	0.70	2.06
Chemical (bags)		
46-0-0	3.14	3.21
14-14-14	2.47	2.45
21-0-0	1.79	1.80
16-20-0	2.09	2.20
17-0-17	1.60	1.42
0-0-60	2.00	2.00
Pesticides (no. of sprays)	3.27	3.57
Labor (man-days)	55.07	57.50

b. **Rice farm production.** Major activities in rice farm production include land preparation, seeding, levelling and marking, transplanting, rice plant care, harvesting and threshing. The farmer entrepreneur manages his rice farm with some degree of precision by preparing and keeping a farm plan and budget. The plan guides the farmer to prepare in advance what he needs per activity and proper time of implementation to avoid wastage of resources. Use of labor is high in Hagonoy because farmers employ the transplanting method of crop establishment. Besides, prior to transplanting farmers hire specialized labor to do the leveling and marking of the field. The skyrocketing prices of farm inputs including labor prompts farmers to look for high yielding rice seeds with guaranteed insect pests and disease resistance as well as good grain quality (both raw and cooked).

Table 29. Characteristics of the farming environment of hybrid rice farmer-respondents in Hagonoy, Davao del Sur, 2003.

Characteristic	Hagonoy, Davao del Sur	
	N = 140	%
Gross Cropped Area		
Below 1	77	55.0
1.0 - 2.0	41	29.3
2.1 - 3.0	10	7.1
3.1 - 4.0	5	3.6
4.1 - 5.0	3	2.1
Above 5	4	2.9

c. **Pre-mill.** Majority of the Hagonoy farmers are tied to private traders for their production and other needs loans at higher interest rates (as compared to banks and cooperatives). A few others however either get production loans from their cooperatives or self-finance their farm operations. Those farmers tied to private traders have no choice but sell their produce to the latter sometimes at pre-determined price. Traders or cooperatives usually have collectors who bring sacks to farmers upon harvest. Said traders or cooperatives may sell the produce to bigger traders or rice millers.

d. **Rice milling.** Big traders and rice millers are usually found in Digos City, an adjacent city to Hagonoy. The proximity of Digos City to big ports in both Davao City and General Santos City is an advantage to processors. For the rice millers, the palay has to possess high milling recovery (not lower than 65%), does not produce broken rice and of good eating quality for it to command higher price as compared to the ordinary palay.

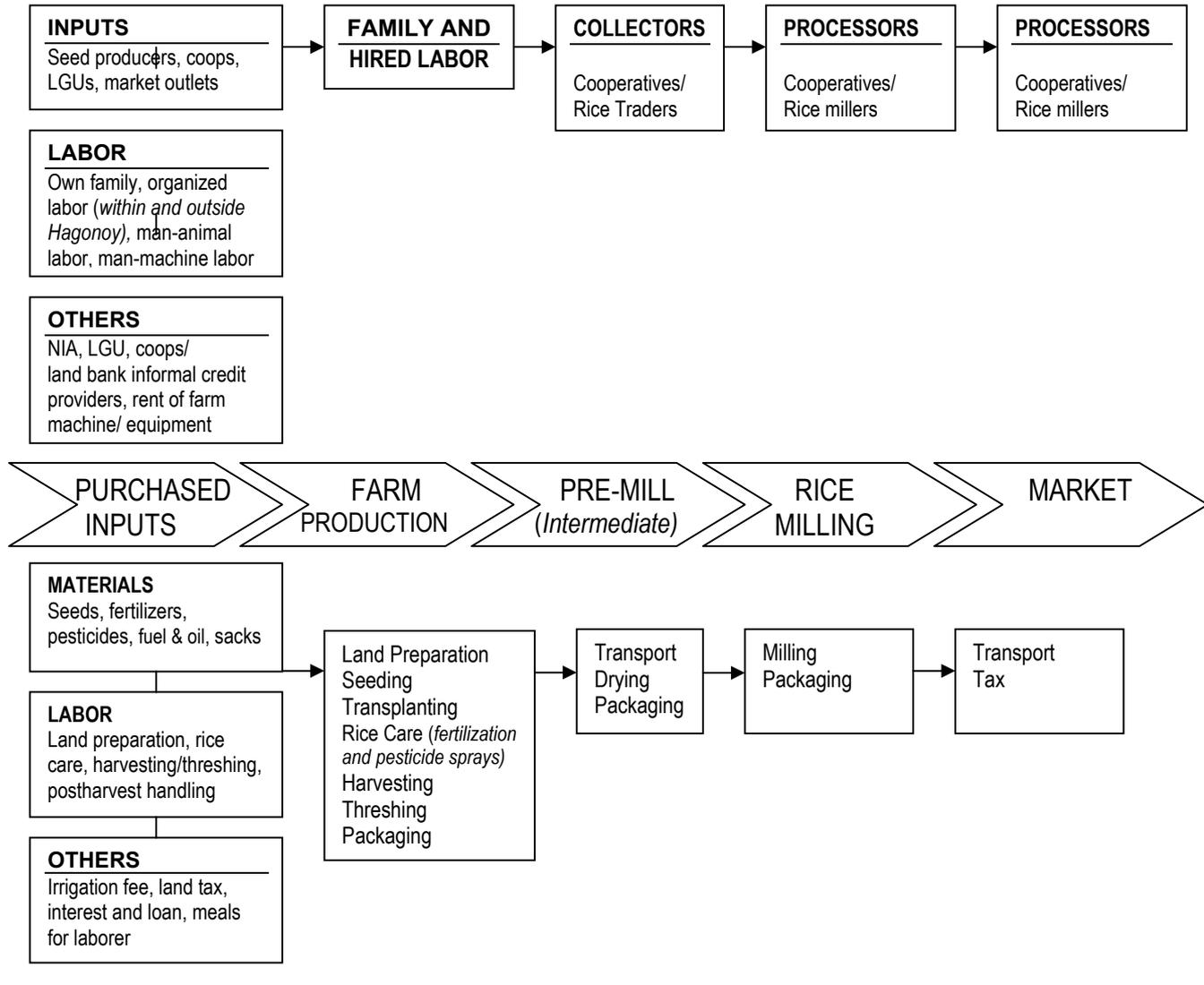
e. **Market.** Rice distributors include the rice traders, the cooperatives and retailers. Visual indicators are used in grading or classifying the rice. But most of all the variety which is known for its accepted high eating quality commands higher prices. Among those varieties which command the highest price in the market (ranging from P21.50 to P22.00) are: 7-tonner (IR -64), F1 (Mestizo or PSB Rc 72H), Masipag and super tonner (NSIC 112).

Looking at the value chain actors and their activities, one can observe some overlaps. Big traders fund the collection, processing and distribution of rice. In most cases they are also very much involved in rice production operation because they help finance the farm inputs of farmers. Unless the small farmers are well integrated into the value chain farmers will always look at traders with some elements of distrust.

The role of cooperatives cannot be overemphasized in rice marketing especially in the rural areas. However, there is concern on assessing the capabilities of cooperatives as regards enhancing their operations as well as their contributing to the rice supply chain efficiencies.

RICE SUPPLY/VALUE CHAIN IN HAGONUY, DAVAO DEL SUR

STAKEHOLDERS AND ACTORS



Chapter Summary

Rice farmers in Hagonoy enjoy various support to their farming activities. Most of the support comes from the national agencies like the DA-PhilRice and BSWM in partnership with the DA-regional field unit and the provincial LGU. The municipal LGU claims playing a support role to the provincial LGU when it comes to rice program in as much as there are many agencies that focus their attention to this sector. Public and private agencies play big roles in making the rice industry of Hagonoy alive. Their forms of support are summarized below (Table 30).

Table 30. Summary of support services provided to rice farmers in Hagonoy, Davao del Sur.

Support services	Public	Private	NGO/ Cooperative
Research and development	DA-Region XI OPAG-DS DA- PhilRice BSWM	Bayer SL AgriTech Seed Coop	
Technology and advisory services	OMAG OPAG	Bayer SL AgriTech	Local cooperatives
Credit services	Land Bank	Local Financiers	Local cooperatives Rural Bank of Digos
Input & Equipment, Crop services, marketing	DA OPAG	Local Financiers	Marketing provided by coop <i>(for members only)</i>
Water resources management services	NIA Padada RIS		IAs

- *ATs get an incentive in GMA Rice national program.*

The Case of PHUSFIMCO: a cooperative that attempts to manage a value chain

Organized on December 20, 1991, the Poblacion Hagonoy Upper Sinayawan Farmer Irrigators Multi-Purpose Cooperative (PHUSFIMCO) started with 15 members with a total rice area of 12 hectares or less than one hectare per member. From a capital of P13,500 in 1991, it grew to P3M in a span of 14 years. Today, PHUSFIMCO has 300 rice-farmer members 75% of whom depend on the cooperative for their production loans and the remaining 25% are self-financed.

The cooperative is governed by a seven member Board of Directors that determines the activities that will be carried out by the manager assisted by a staff of seven that include a bookkeeper, cashier, treasurer, posting clerk, warehouseman, loan officer and a collector.

For the first time, PHUSFIMCO made an attempt into vertical integration by controlling various stages of the value chain which include production, milling and distributing to retailers or direct selling to consumers via its market outlets in Hagonoy and Padada. To encourage its farmer members to patronize the chain, the cooperative buys the farmers fresh harvest produce at P0.50 per kg higher than the prevailing market price (or P 10.50 and P11.50 per kg for ordinary varieties and IR 64/PSB Rc 72 H, respectively). It has renamed or "branded" the inbred variety NSIC 112 as "super tonner" and classified it along with IR 64.

This strategy has been resorted to because of consumers demand for quality rice (e.g. pure IR 64 or PSB Rc 72H commonly known to consumers as F1). With the cooperative's close monitoring among its members, it can guarantee quality of its product. In fact, a big banana plantation would like to enter contract for the coop to supply its employees' rice requirements. However, the Board of Directors thinks the cooperative is not ready to enter into contract for lack of capital to ensure regularity in the delivery of milled rice.

What is important here is that PHUSFIMCO was able to demonstrate that with this new system of managing the value chain the farmers are able to benefit in terms of higher buying prices leading to better income from rice production.

CHAPTER 4

Knowledge Management of the Local Extension Services

Agricultural information or knowledge whether generated locally or from outside are important elements in the development of a farming community. Indigenous or local knowledge has always been the common source of ideas to many resource poor farmers. Information coming from the outside, public or private agency, research or extension organization can also provide fresh ideas and awareness of new opportunities for the farming community. Knowledge generated by formal research can provide impetus for agricultural change.

With the rapid developments in information and communication technology (ICT), the agricultural extension services have more aids to managing knowledge or information so that more people will have it on time to make important decisions on their farming. The only constraint will be the availability of resources to finance the use of information technologies. From the traditional farm and home visit, agricultural technicians as well as farmers can now explore the use of cell phones through text messaging to ask or convey information. However, some researchers have cautioned against too much optimism on the potential of ICTs. There have been projects that worked well during the pilot stage but failed to deliver on a longer term.

1. Organization, structure and financial support

The Office of the Municipal Agriculture (OMAG) handles the extension services related to agriculture and fisheries as well as cooperative development. Manning the office are: one (1) municipal agriculture officer (officer-in-charge) and eight (8) agricultural technologists to cover 21 barangays in the municipality. Understaffed, the office follows a simple organizational structure, generally flat with only two levels (head → ATs). Each staff has been assigned to handle different programs and 2–3 barangays.

To cope with its situation of delivering agricultural programs and services to all its 21 barangays with limited personnel, the OMAG adopts the following strategy: a) ATs handle one or more programs covering two or more barangays; b) strengthen linkages with local, provincial, regional and national offices that implement agriculture programs; c) prioritize its programs with banner programs given full support and providing assistance to linkage programs (public or private); d) strengthen its cooperatives and farmers' organizations to lend support in technology dissemination, pest and technology performance monitoring, and community mobilization; and exploit the use of information technologies like cell phones.

Although dominated by the male gender, three out of eight agricultural technologists (ATs) are females. From the interviews with them, ATs do not have gender stereotyped roles. They reported getting equal chances to be assigned a task on technology promotion, be it rice, animal husbandry, fisheries, or cooperative development. Academic preparation and demonstrated interest seem to be the more important criteria in the distribution of ATs' assignments. Interestingly, all have agriculture-related degrees as academic preparation. In addition to their academic

preparation, the AT's were quick to volunteer their being born to farmer-parents that provided them early socialization in agriculture in its most natural setting.

Considering their ages, all of them are beyond 40's but most are in their early to late 50's. With this age, they are not likely as energetic as their counterparts in the 20's but their advantage could be that they appear more credible to older farmers. From their faces, one gets the impression

Table 31. List of OMAG personnel in Hagonoy, 2005.

Name	Gender	Age	BS Course
1. Bacosa, Marcos	Male	52	BSA Botany
2. Bariquit, Felix	Male	49	BS Soil Science
3. Cambarijan, Erlinda	Female	58	BSA Botany
4. Cabardo, Mercedes	Female	44	BS Fisheries
5. Culango, Virginia	Female	53	BS AgEducation
6. Gabutan, Wilfredo	Male	42	BS Vet. Science
7. Hermosura, Rodrigo	Male	52	BSA Botany
8. Pascual, Armando	Male	52	BS Animal Nutrition

Financial support to agriculture has improved since late 90s; whether it be for personnel services or for operations (Table 32). However, considering the skyrocketing hike in oil and prices of commodities the municipal agriculturist reported that the fund increase would not suffice to meet the financial requirements of their planned extension programs. The allocation for operations has plateaued for two years. As to the use of the 20% development fund, a good portion has been allocated for the use of their banner program on coastal resource management which does not get any fund support from the national agencies.

Table 32. Financial support to agriculture, Hagonoy, Davao del Sur, 1997-2005.

Category	1997	1998	1999	2004	2005
PS	1,437,000	1,790,000	1,790,000	2,371,107.00	2,392,661.00
MOOE	415,000	454,000	1,070,000	329,592.00	354,000.00
LFP (20% development fund)				520,000.00	798,500.00
TOTAL APPROPRIATIONS	1,852,000	2,244,000	2,860,000	3,220,699.00	3,545,161.00

Among those problems perceived by most of the ATs (62.5%) as constraints to effective implementation of extension programs are: source of funds and lack of IT facilities (Table 33). Given the limited budget, the OMAG staff find it difficult to initiate activities that will address some of the information and skills needs of their farmers. The ATs cannot respond to farmers' problems coursed through text messaging or personal communication because as generalists they wouldn't have the answers to farmers' inquiries. Perhaps, if the OMAG had internet connections then the staff would be able to search for answers to farmers problems.

Table 33. Problems encountered in implementing agricultural extension programs/ projects in Hagonoy, Davao del Sur.

CATEGORY (n = 8)	f
Problems encountered	
No traveling allowance within the area of jurisdiction	3
Poor response at the community level	2
Source of funds	5
Source of fingerlings is very far from cooperators	1
Late arrival of farmers during meetings	1
Lack of IT facilities (e.g. computers, telephone)	5
Rough/bad roads	2
Pest outbreak	2
No stable price for animals	1

2. Knowledge/information needs of farmers

Problems encountered by farmers are rice-farming related (Table 34). Though farmers in Hagonoy are noted for their high production yields in rice per hectare, they still claim to have production problems. For instance, after using IR 64 for about two decades now they have observed pest and disease problems which have resulted to decrease in average yield per hectare from six tons to four tons in 2004. The rice tungro virus has infected the IR-64 plants while the bacterial leaf blight has damaged the PSB Rc 72H plants. Blast is also observed to infect the NSIC 112. Apart from the diseases attack are the pest problems like the stemborers, leafrollers, and cutworms.

Farmers also complain about the rising costs of labor, fertilizers, pesticides and food that farmers need to give farm workers at their break time. In areas with synchronous planting, farm workers have the choice to work for farmers that can provide more incentives or freebies. That is why there is a pressure on farmer operators to offer additional incentives to farm laborers that can deliver better quality work. In Hagonoy, there are groups of workers whose livelihood it is to sell their labor to farm operators. The group's leader usually looks for possible work contracts done informally with farm operators. The organization of farm workers makes farm operation management easier to handle.

Although farmers did not list post production as a problem, but from discussion with them it appears that they need knowledge and information on marketing their produce or adding value to their products in order for them to achieve more income. Once their skills in marketing are honed, farmers do not need to depend on traders for their loans and market for their produce. Instead, they will be able to manage production as well as post-harvest operations to meet standards of buyers or local traders.

Table 34. Agriculture information needs and sources of Hagonoy farmers.

CATEGORY (n = 24)	f
Type of information	
Production	24
Postharvest practices	1
Chemicals and fertilizers	3
Nutrient management	2
Improved seeds	2
Commodity	
Corn	1
Fish	1
High valued crops	1
Livestock	6
Rice	13
Vegetables	5
Sources of information	
Book, technoguides, brochures/leaflets	5
Techno demo farm research reviews	2
Video tapes	1
Feed/chemical/seed company	7
National, DA-RFU, BFAR, PVET, USP/USM	15
PhilRice, IRRI, ATI, OPA	12

3. Farmers' awareness and utilization of new technologies

The divergent nature of rice farming systems in Hagonoy influences farmers' utilization of research-generated technologies. Usually, the more progressive and better-educated farmers are highly adoptive of technologies produced by research. Also, those who come from an area where synchronous planting is practiced get better yields and have lesser production costs. Hence, they get greater profit. With this scenario, extensionists find it easy to promote research-generated technologies to farmers.

For farmers who do not have capital to finance the cost of production, and whose farms have problem soils, the links between research and extension are usually weak as can be seen in the low utilization of technologies among those who have not served as cooperators of nationally-initiated technology demonstration projects. Cooperating farmers in technology demonstrations such as balanced fertilization and seed production have higher rates of utilization for recommended technologies. It is very encouraging that these farmers have slowed down in rice straw burning. Instead, they have piled the rice straw in one corner of the field, allowed it to rot and later incorporated into the soil during land preparation of succeeding season.

Table 35 shows farmers' awareness on the research-recommended rice production practices. Higher awareness is observed among farmers involved in the technology demonstration project as compared to those in areas without project.

This finding could also be related to farmers' level of knowledge on new technologies and of course, levels of understanding on how the technology works. Farmers in the project areas are more exposed to technology updates than those in non-project areas.

From both farmer groups, there is high awareness of high quality seeds or at least certified seeds. Farmers in Hagonoy are convinced that the use of quality seeds contribute to the achievement of higher yields. That is also why shifting to the use of F1 hybrid seeds was not very difficult as long as the seeds are guaranteed to have very high germination rate.

Table 35. Farmers' awareness of research-recommended rice production practices.

Category	Hagonoy, Davao del Sur		
	With project (n=30) Without project (n=70)		
	H %	M %	L %
With project			
Use of high yielding varieties (<i>including F1 hybrids</i>)	83.33	10	6.66
Use of quality seeds	73.33	16.67	10
Non-burning of straw	66.66	0	33.33
Balanced fertilization	83.33	10	6.67
Pest identification & monitoring	100	0	0
Synchronous planting	83.3	6.67	10
Without project			
Use of high yielding varieties (<i>including F1 hybrids</i>)	84.28	11.43	4.29
Use of quality seeds	64.29	28.57	7.14
Non-burning of straw	58.57	10.00	31.43
Balanced fertilization	37.14	14.29	48.57
Pest identification & monitoring	91.43	4.28	4.28
Synchronous planting	87.14	12.86	0

H - High M - Medium L - Low

Source: *Opinion Survey of selected rice farmers in Hagonoy, Davao del Sur, December 2004.*

On the whole, full adoption or utilization among farmers in Hagonoy is observed to be highest in pest identification and monitoring (92%), synchronous planting (90%), and use of high yielding varieties including hybrid rice varieties (85%). Lower rates are seen in the use of balanced fertilization because of the high cost of commercial organic fertilizer. At most farmers use both organic and inorganic fertilizers in their seedbeds to help ensure "good" start of the rice plants.

Table 36. Extent of use for recommended rice production practices in Hagonoy, Davao del Sur, DS 2003 – 2004.

Category	Region XI Davao del Sur		
	F %	M %	R %
Use of high yielding varieties (including F1 seeds)	85	14	1
Use of quality seeds	74	25	1
Non-burning of straw	52	22	26
Balanced fertilization	44	19	37
Pest identification & monitoring	92	7	1
Synchronous planting	90	7	3

F - Full adoption

M - Modified

R - Rejected

4. Programs

The OMAG of Hagonoy has prioritized some activities and allocated fund for them. These activities are concentrated on those which the national agencies do not pay so much attention in terms of support. Allocation fund usually comes from the 20% local development fund. Examples of activities with their corresponding fund are as follows:

Programs	Budget
Livestock dispersal (goats)	50,000.00
Pests/disease prevention/control	40,000.00
Support to cooperative development	40,000.00
Upland resource management	50,000.00
Farm youth development	25,000.00
Farm home resource management	20,000.00
Livestock upgrading	40,000.00
Aid to muni. agric'l and fisheries council	45,000.00
Fisheries development (marine & inland)	110,000.00
Livestock and poultry health care	48,500.00
Environment protection	80,000.00
Solid waste management	200,000.00
Completion of municipal agriculture office	50,000.00
Total	P 798,500.00

Source: Hagonoy OMAG Report, 2005.

4.1 Banner Programs

As earlier mentioned, this major rice producing municipality puts much of its resources to these two banner programs: a) Coastal Resource Management Program and Fisheries Development, and b) the Cooperative Development Program. Only the latter program has direct relationship to increasing rice productivity.

Its Coastal Resource Management Program is aimed at preserving its fish sanctuary and establishing mangroves. To achieve these objectives, the OMAG has strong linkages with the DA-Regional Field Unit XI, the Provincial Environment and Natural Resources Office (PENRO) and the Department of Environment and Natural Resource (DENR).

When asked about the strong emphasis on coastal resource management and cooperative development, the OMAG staff interviewed were quick to reply that the municipality did not feel the national government's support to these programs which are important to some poor sectors in its barangays. By prioritizing these programs, the Hagonoy LGU through the OMAG was able to propose and received financial and technical assistance from the province, regional and national line agencies like DENR.

4.2 Rice Programs

Rice production ranks second in agricultural land utilization. Hagonoy has a total of 3,511 hectares of potential irrigable area within the service coverage of the Padada River Irrigation System. But only about 2, 626 hectares of irrigated lands are planted to palay.

While Hagonoy registers as the highest in average rice yield 4.37 tons per hectare for inbred and 6.33 t/ha for hybrids (2005) in irrigated lowlands among the rice producing municipalities in the province, the OMAG has relied heavily on national government's program on rice coursed through the Regional Field Unit and the provincial agriculture office.

4.2.1 Hybrid Rice Commercialization Program (HRCP)

Description of the project. The Hybrid Rice Commercialization Project (HRCP) started during the wet season of 2002. More than a thousand farmers availed themselves of the program benefits which included availability of and 50% subsidy of the market price of the hybrid seeds, market development for hybrid rice (F2), technology updates through farmers' briefings/classes and visits of extensionists or hybrid rice experts from the OPAG and the OMAG, access to production loans through farmers' cooperatives and banks, and in some cropping seasons subsidy to inorganic fertilizer.

4.2.2 Kasaganaan ng Sakahan at Kalikasan (KASAKALIKASAN)

Description of the project. The Kasaganaan ng Sakahan at Kalikasan or KASAKALIKASAN, the National Integrated Pest Management (IPM) Program, represents the government's commitment towards promoting sustainable agriculture and rural development. The program was launched by then Pres. Fidel V. Ramos on May 3, 1993 through Memorandum Order No. 126. He also issued Administrative Order No.

126 urging all government instrumentalities to support IPM to combat production losses due to pests and diseases. The long-term goal of the KASAKALIKASAN is to make IPM the standard approach to crop husbandry and pest management in major rice, corn and vegetable growing areas of the Philippines. To achieve this, farmers need to apply IPM methods which they will learn from the government or non-government organization field workers and from other farmers. The achievement of the long-term goal is expected to lead to 1) reduced risks of pesticide-induced pest outbreaks, 2) higher and more stable farm incomes, 3) reduced health hazards for farmers and consumers, 4) reduced environmental damage, and 5) strengthened farmer organizations and farmers' management capabilities.

At the local level, the IPM program supports the development of the human resources, which is required for the successful implementation of the program at the provincial and municipal levels. This involves the training of coordinators, trainers and farmers. The Farmers' Field Schools (FFS) serve as the social laboratory of the IPM program and they also serve as venue for promoting other rice production technologies. Those who finish their IPM trainings for the FFS join the network of village farmer groups.

The selection of FFS sites is based on the following criteria: 1) area of intensive cropped fields within an extension area; 2) accessibility of the area from the trainers' and extension workers' rural extension center; 3) presence of active farmers' groups in the extension area and how many; 4) competency of the extension workers assigned to the area. On the other hand, participants of FFS must meet the following criteria: 1) active farmer; 2) able to attend all of the field school sessions; 3) willing to and able to act as an informant about IPM for the rest of the members of his or her farmers' group.

In 1998, a number of farmer-graduates from Hagonoy participated in the FFS classes. In 1999, additional FFS trainings were conducted in major rice growing barangays of Hagonoy, Davao del Sur. The farmers who were involved in the project realized the importance of pests monitoring as a basis for their decision on what pest control strategies to use. In 2000, series of FFS sessions were conducted in order to educate farmers on the advantages of using integrated pest control methods. In 2004, the municipal agriculture could no longer conduct FFS activities due to non-availability of funds.

4.2.3 The USM-PhilRice Technology Promotion Project (formerly called Mindanao Rice Research and Extension Project)

"Mindanao can be the new rice granary and exporting region of the country." So, goes the belief of the MRREP proponents. To realize this goal, PhilRice scientists in partnership with SCUs, LGUs and DA-RFUs

proposed a project entitled Mindanao Rice Research and Development Project. Initiated by PhilRice, the proper document was prepared by R & D specialists from Mindanao to speed up implementation. The specialists who helped frame the program realized that the very first step to increase rice production in Mindanao is through the implementation of a unified rice research and development program in the island.

The framework plan, prepared in 1994 at the University of Southern Mindanao (USM) and Central Mindanao University (CMU) and launched at the Mindanao State University (MSU) a year later, became an inter-agency cooperative undertaking. The Philippine Rice Research Institute, together with state colleges and universities, the regional field units and outreach stations of the Department of Agriculture, local government units, and non-government organizations collaborated in preparing the plan. This plan served as the principal instrument in seeking funding support for a unified rice research and development project in Mindanao. The framework plan also became the principal basis for PhilRice to incorporate the project as the institute's regular project.

Taking leadership to pilot selected rice research and extension projects, the USM team proposed research and extension project for the Cotabato River Basin provinces and Davao del Sur. A memorandum of agreement signed by the DA-PhilRice Executive Director and the USM President in 1997 signalled the formal beginning of rice research-extension linkage in Central Mindanao.

The Philippine Rice Research Institute, as the lead implementing agency, oversees the following functions: the release of funds; providing technical assistance to cooperating agencies in implementing project activities; and train researchers of cooperating agencies. The Department of Agriculture Regional Offices contribute to the project in the form of sharing of physical facilities, providing manpower assistance, providing assistance in the dissemination of information, and implementation of research projects that are in line with regional priorities. Moreover, the local government units or the provincial and municipal governments identify sites for experiments, mobilize communities for technology promotion and disseminate information to local communities. The University of Southern Mindanao implements research projects and trains researchers as well as extensionists and farmers. The non-government organizations assist in the setting up of field experiments, facilitate the participation of farmer groups in experiments, disseminate information for extension, and monitor performance of the project.

The USM-PhilRice Technology Promotion Project, with its research functions, conducts adaptive researches on rice and other researches expected of a member in the PhilRice network. Since 1997, the USM-DA-PhilRice team was regularly conducting the national cooperative testing (NCT) for irrigated lowland rice and hybrid rice and techno-adaptation project (TAP) in Hagonoy, Davao del Sur. Studies are being conducted to determine the yield potential, range of adaptability and field reactions to

pests and diseases of promising irrigated lowland rice, hybrid rice, and upland rice selection/lines and identify those that could be considered for national or regional recommendation.

With its extension functions, the project promotes superior rice production technologies generated by research stations based on farmers' needs through massive trainings/public education campaigns with seed kit distribution, technology demonstration and adaptation trials in farmers' fields and communicates the results of research-generated rice production technologies tested in farmers' fields to research stations. The project also identifies production constraints of rice farmers in Hagonoy, Davao del Sur and advises DA-PhilRice for further research.

In managing links, the project supports local government units (provincial, municipal and barangay levels) in the dissemination of rice-based development programs to the clientele and foster links between DA-PhilRice, USM and other government organizations like the National Irrigation Administration, Agricultural Training Institute, Bureau of Agricultural Research, Department of Agrarian Reform, Department of Education, Culture and Sports and other institutions.

Although the USM-DA-PhilRice project is nine years in existence, it operates on a project basis which seeks approval yearly.

4.2.4 Balanced Fertilization Strategy Techno Demo Project

Description of the project. The Balanced Fertilization Strategy Technology Demonstration Project is an intervention under the Gintong Ani Program that provides location specific fertilizer recommendations in order to reduce the effects of variations in soil and climatic conditions in various grain producing regions in the country. Balanced fertilization is the optimum use of organic and inorganic fertilizers with the proper grades and amounts that supply the correct ratio of plant nutrients and which ensure that soils will sustain high crop yields over long cropping seasons. The BFS Techno Demo Project is implemented nationwide by the Department of Agriculture through the Bureau of Soils and Water Management in collaboration with PhilRice, Bureau of Agricultural Research, Agricultural Training Institute, National Irrigation Administration, Bureau of Post-Harvest Research and Extension, DA-Regional Field Units, Research Outreach Stations and the local government units.

In general, the project aims to improve the efficiency and productivity of rice areas through the implementation of the balanced fertilization strategy. Specifically, it aims to showcase the balanced fertilization strategy for rice; enhance technology transfer; monitor soil changes and crop responses; strengthen involvement and linkages between LGUs, SCUs, NGOs and DA in collaborative endeavors; and assess the adoption of technology, benefits to farmers and environmental impact of the balanced fertilization strategy.

The funds for 1998-1999 BFS techno demo project came from BSWM. The BSWM utilized the DA-PhilRice recommendations but focused on balanced fertilization based on soil characterization. In 1998, BFS techno demo was conducted in 10 hectares of rice farms involving 10 farmer-cooperators at barangay Sinayawan in Hagonoy, Davao del Sur. Production yield of the techno demo averaged 7.5 tons per hectare. Encouraged by the results of the techno demo, the Bureau of Soils and Water Management mobilized its human and financial resources in 1999 by extending P860,000 for the operationalization of the Technical Assistance Program, which focused on the development, conservation and management of soil and water resources. The program covers 244.0 hectares, which serve as model farms that showcased BFS (correct mixture of organic and inorganic fertilization and other soil amelioration) located in the municipalities of Magsaysay, Bansalan, Matanao, Hagonoy, Digos and Sta. Maria, all in Davao del Sur.

4.2.5 Provincial Rice Compact Seed Production and Technology Demonstration (Binhi 100)

Description of the project. The Provincial Rice Compact Seed Production and Technology Demonstration is a 100-ha seed production-cum technology demonstration project aimed at producing a part of the registered and certified seed requirement of the province through the leadership of the provincial government. The project is seen as an efficient tool for research-cum-extension as the agricultural technicians from the local government units are involved in supervising and monitoring the demonstration plots hand in hand with the farmer-cooperators. Technologies that are showcased in the techno demo are the use of 20 kg of high quality seed per hectare, balanced fertilization strategy (including the use of leaf color chart), and Integrated Pest Management (IPM). Among the interventions of the project include the provision of registered seeds of three to five varieties, one bag urea per hectare and training.

The goal of the project is to demonstrate improved production technologies in 78 provinces with compact 100-ha fields using DA Rice Technology Demonstration Approach. Specifically, the techno demo aims to demonstrate updated rice production technologies; to produce adequate amount of certified seeds for planting in the target areas of the province; and, to assist the provincial LGUs in implementing a sustainable seed production program.

The Department of Agriculture provides funds: 1) to procure from accredited seed growers foundation and registered seeds which will be planted by organized farmer-cooperators, and one bag urea per hectare, 2) to produce billboard, 3) to defray expenses for field day, and 4) to assist local government agriculturists in implementing the project.

PhilRice, as the implementing agency and as source of technology, assists the LGUs and DA-RFUs in sourcing registered seeds if not available in the locality, and pays for the registered seeds upon submission of supporting papers. The provincial LGU and the DA-RFUs, on the other hand, are responsible for sourcing the registered seeds to be planted by the cooperators. Besides, the provincial government also procures the seeds that will be produced under the project and distribute the seeds to farmers within the province, either through sale or outright grant. Training needs of the project are provided by the DA-Agricultural Training Institute.

The Department of Agriculture through the PhilRice extended financial assistance of P1M for the operationalization of the seed production project on selected 100-hectare compact irrigated areas in Davao del Sur. A total of 64 hectares compact rice farms involving 43 farmers were established during the wet season of 1999 yielding an average production per hectare of 5 MT. The compact irrigated rice farms showcased the use of 20 kilogram of high quality seed per hectare, balance fertilization strategy (including the use of Leaf Color Chart), and Integrated Pest Management (IPM).

4.2.6 The DOLE-Philippines Rice Seed Production

Implemented in 1998, the DOLE (Philippines) ventured on rice seed production project in Davao del Sur. An important component of the project was the series of rice seed production trainings for farmers who would like to participate in the project. About 20 batches of farmer-trainees were produced by the project which was implemented in collaboration with the OPAG (Davao del Sur) and the municipalities of Hagonoy, Digos City, Magsaysay, Matanao and Bansalan.

The OPAG has reported 497 Hagonoy farmers (334 male farmers and 163 female farmers) who were trained by DOLE on rice seed production. These trained farmers were expected to plant either foundation or registered seeds so that they could produce either registered or certified seeds category after passing seed inspection and laboratory tests conducted by the National Seed Quality Control Services (NSQCS) of the Bureau of Plant Industry (BPI). The OPAG provided personnel to inspect the seed production areas while the OMAG took care of monitoring the problems encountered by the farmers in their seed production project. In Hagonoy, four (4) farmer-cooperatives were involved: Cooperative of Hagonoy Farmers (COHFA), Bayanihan Hagonoy Marketing Irrigators' Cooperative (BAHMICO), Hagonoy Seed Producers' Cooperative (HASEPCO), and Poblacion Hagonoy Upper Sinayawan Farmers Irrigators Multi-Purpose Cooperative (PHUSFIMCO) .

This seed production project's success was short-lived in as much as DOLE had to stop buying the certified seeds produced by

the farmers in 2001. Being an expert in pineapple marketing locally and abroad, DOLE probably thought it could easily market the certified seeds which it bought back from its farmer seed producers. Unfortunately, seed producers in other provinces complained about the influx of rice seeds from Davao del Sur

5. Knowledge management by the OMAG

Considering its area and diverse clientele especially on crops preferred and resources capacity, the OMAG of Hagonoy has utilized a number of approaches just to meet the information needs of its various clientele. The approaches overlap just as the lean staff has multiple assignments.

Staff assignment per area. Each staff has been assigned an area coverage (2-3 barangays) and specific commodity or special program to handle. This way, the OMAG hopes to provide a more responsive advisory services with a technical expert (each AT) responsible for identifying and trying to meet the information needs of farmers. However, the OMAG encountered some problems with this approach like: transportation costs for wider area coverage, field of specialization does not allow shifting knowledge in all fields of interest of the farmers in the area of coverage, non-exposure to new knowledge or information on various interests of the farmers, and attitudinal problem of the ATs.

Use of farmer networks. The OMAG invests in the strengthening of the farmers' cooperatives. The staff reported that ease in communicating with farmers comes when it utilizes its networks like the farmers cooperative and the irrigators associations. These farmer networks have developed their own system of policing their ranks and compelling farmers to attend meetings, for instance.

Improvement of various services. Services like roads, advisory services, credit, research and extension can help in the spread of information as well as getting feedbacks from farmers. Indigenous or local knowledge is captured through farmers participation in adaptation trials as well as in technology demonstrations. Farmers introduce their own innovations to trials or technology demonstrations because of their resource capacities, interests, risk management skills and aspirations. Though not easily documented, these local knowledge is better caught through constant visits and dialogues with farmers. Through provision of credit, the OMAG through the cooperatives or financiers encourages farmers to utilize new technologies or meet standards set by local market.

Linkages with national, regional, and local agencies. Since rice programs implemented at the barangay and municipal levels are nationally-initiated, the OMAG finds an ally among national agencies like PhilRice and BSWM in disseminating new information on rice to the farmers. The LGU is also relieved of the expenses that go with monitoring and evaluation of the performance of new technologies at the field level. The problem with this approach is the OPAG usually stands as the official partner of the national

agency at the planning and implementation stages. The OMAG complains about non-receipt of fund to closely monitor farmers feedbacks in said linkage programs.

Use of ICTs. The OMAG has explored the use of cellular phones to contact farmers and monitor their problems. Usually, barangay captains have cellular phones and some progressive farmers do have. Problem however is that ATs need to see the reality on the ground to be able to recommend possible solutions to farmers problems But, text messaging through the cell phones has been a helpful way of disseminating advice and information from farmers. Definitely, the expense incurred through text messaging has been a lot lower than when the ATs actually visit farmers fields. Price monitoring has also been done through text messaging.

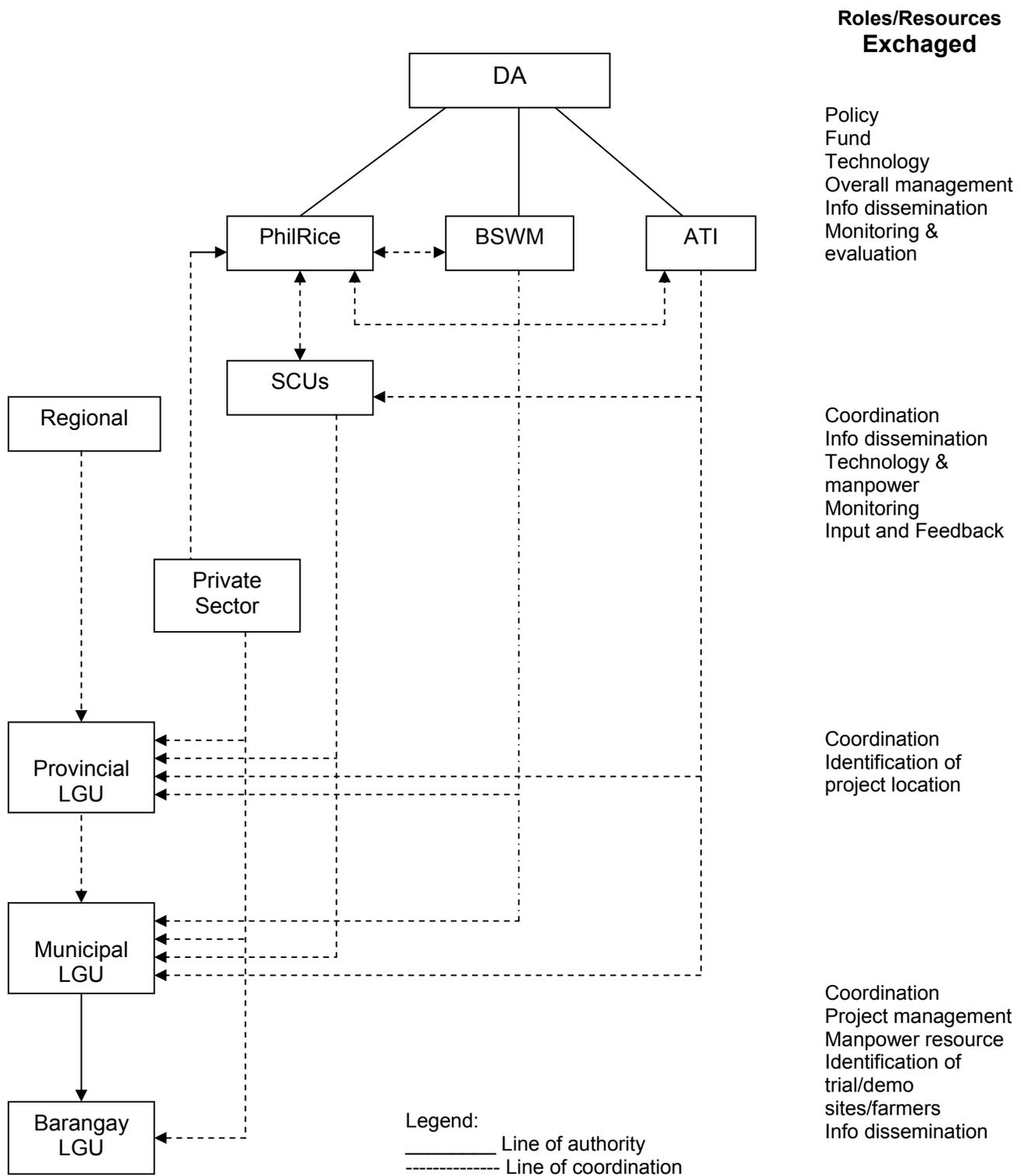


Figure 14. Actual roles and resources exchanged among linkage actors.

Chapter summary:

The agricultural knowledge and information systems may vary between and among municipalities. In Hagonoy, the OMAG has used different strategies to manage knowledge and information on rice. Primarily, it has relied on *staff assignment per area, use of farmer networks, Improvement of various services, and Linkages with national, regional, and local agencies*. The OMAG has reported that the national programs on rice coursed through the RFU and OPAG have been particularly important channels of communicating new information on research generated technologies. The use of farmer networks and improvement of extension services like technology demonstrations allows the OMAG to capture indigenous or local knowledge so that these can be integrated with the scientific knowledge. But the use of text messaging through the cell phones has been very helpful in disseminating information to farmers and in getting their feedbacks on technologies demonstrated. Probably, in the near future sourcing out information than can better address farmers problems through the computers' internet connections will be available for use of the OMAG and the farmers.

CHAPTER 5

Conclusions and Recommendations

The province of Davao del Sur is not only blessed with good soil and climate but also hard working farmers the grow various crops. Its favorable climate has invited investors in plantations specifically in coconut, banana, mango and sugarcane. Among the small farmers, rice is a favored crop. One of its municipalities, Hagonoy, is noted to be registering high average yield per hectare. In fact, PhilRice reports that Hagonoy farmers have the highest average rice yield per hectare in Mindanao at 6 t/ha or better in 2000.

Because of the reputation of being a top yielder in rice in Mindanao, Hagonoy has been a favourite choice of national agencies, the Department of Agriculture and the PhilRice, for their new rice programs. Even the DOLE (Philippines) ventured on rice seed production and marketing starting in Hagonoy and expanded in neighboring municipalities because of this status earned by Hagonoy farmers. In all these linkage projects, however, the OPAG played as major partner of the national agencies and the DA regional field unit. The OMAG played a facilitative role in identifying farmers and project sites as well as visiting farmer cooperators for their feedbacks on technologies demonstrated.

Among the knowledge management approaches utilized by the OMAG are: *staff assignment per area, use of farmer networks, Improvement of various services, and Linkages with national, regional, and local agencies*. The OMAG personnel have reported that managing knowledge (usually coming from research agencies) has relied on these approaches to provide a more responsive advisory service to the rice farmers. In fact, the national rice programs implemented in Hagonoy have utilized these approaches. But these approaches have their own strengths and weaknesses. Farmers still complain about making small net income from rice farming as a result of high costs of inputs, susceptible varieties to pests and diseases, lack of access to low interest credit, and limited market knowledge. Even farmers cooperatives have similar complaints.

One specific setback of rice farmers in Hagonoy is though they may achieve high yields (6 tons or better per hectare), they do not have the necessary marketing networks that value product differentiation such that high quality "palay" would command better prices. This means that rice varieties with good rice eating quality besides IR 64 and Mestizo 1, should have similar price. While a few traders would give an additional P0.50 per kilogram over the ordinary rice's price to specific varieties such as NSIC 112 or popular known in Hagonoy as "super tonner", this is more of an exception rather than the rule. Aggravating the problem is their being tied to the apron strings of big rice traders/millers for their production and emergency needs loans thereby putting them at the mercy of the traders for whatever prices the latter would dictate at harvest. Hence, the prospect of benefiting from higher rice yields is not that rosy.

In the context of the value chain, research and extension as support services are expected to emphasize (1) products, not commodities, (2) integrated supply chains, not many intermediaries, (3) flexibility, rather than specialization, (4) networks, rather than independent producers, and (5) teamwork, rather than direct competition (Flora, 2004). This means that by enhancing the capacity of farmers, they will be in a better position to make more informed decisions to ensure that the buyers of their rice produce will be happy and satisfied; thus, they will keep searching them out as their product suppliers in the chain. Correct information on what the traders and processors need and value will help farmers develop a market orientation that will lead to greater efficiency of the value chain. At present, farmers are only dependent on their trader-partners (to whom they have been indebted either in their production inputs or emergency needs) for information. This requires capacity building not only on the part of the farmers but all actors in the chain.

The extensionists should now look at ways of linking farmers/producers to new markets, new ways of production, new sources of capital, and new partners in production and marketing. With the new orientation, the extensionists may look at training, livelihood seminars, market awareness exercises, and modern rice production technologies that will help ensure farmers' efficient access to the market. They could also help establish a quality system infrastructure that will provide farmers with valid and reliable information on other chain actors' product preferences. Extensionists might also provide advisory services to farmers on the implications of entering into marketing contracts. One of the problems with contracting is the lack of transparency in market transactions, which makes it difficult for farmers to assess the merits of contracting. The local government units through the agriculture extension services may play a role in advising farmers on assessing contract terms (Young and Hobbs 2002).

It goes without saying that technical innovations in a value chain generally require greater investments in capital and knowledge-intensive production. A good example is commercial hybrid rice production. Besides higher production costs and more informed decision, there is increased dependency between and among actors in the value chain.

The study has shown that farmers have multiple sources of information within a given farming system. In addition to formal institutions like the national and regional agencies, the provincial and municipal agriculture services of the local government units, farmers seek out or exchange information and knowledge with input suppliers, traders and other private individuals who have stakes in rice production and marketing. Much of the information travels freely but some may also come with a fee. Such stakeholders (public or private) in rice may interact either to fulfill their needs or to pursue their interests. And as they interact with one another, information on prices, market opportunities, new technologies and practices as well as policy changes is also exchanged.

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