Transforming the Land Through a Diversified and Integrated Farming System: The Story of Rodolfo Oray

By Jelson T. Garcia and Lindsey Mulkins

Introduction

It was my second visit to the province of Negros Occidental. Though I knew the place was the Philippines' largest sugar producer, once ill-famed for its famished *sacada* or underpaid seasonal sugar workers, I never thought that this time, I would have a close encounter with some farmers who once worked in the sugarcane plantations. In the southern part of the province, I had heard that many farmers have strayed from this cash crop that continues to dominate the agricultural landscape of Negros.

With the goal of learning about and documenting the conversion process from a sugarcane monoculture to a diversified and sustainable landscape, I was directed to visit with the farmer Rodolfo 'Dolpo' Oray.

From the barangay proper of Tapi, Kabankalan City, I had to pass through the intervening sugarcane plantations to get to Dolpo's farm. Forty minutes of brisk walking and I saw Dolpo's semi-concrete house standing in the middle of approximately three hectares of vegetation, bound by some mini-forest and fruit trees. Two young boys sitting on a bench facing the main door of the house greeted me. I asked if their father was around and they told me they would bring me to him on the rice paddy. On our way, we passed by contoured plots planted with sweet potatoes, squash, radish and watermelon. Along the contour lines stand native lemon tree, guava, pineapple and various flowers that serve as insect repellant, Dolpo's sons told me. The farm presented diverse plants, trees and livestock, providing a sharp contrast to the sugar monocultures that I traversed before I arrived in Dolpo's. I smelled the dung of a carabao (water buffalo) permeating the air as we stopped near eucalyptus tree. There I saw the carabao urinating, its discharge going straight to the rice paddy. I saw Dolpo warmly welcoming my presence.

It was almost twilight so Dolpo invited me to his house. His two other boys and younger daughter just arrived from school. After changing clothes, the two boys started fetching water while the youngest helped his mother, Racquel, feed the chicken and pigs. Dolpo's eldest son cut some fuel wood while his daughter prepared the hearth to cook rice. I noticed Dolpo readying his petromax light that serves as the alternative to electric lighting for he and his neighbors.

The sights I had come across during my visit overwhelmed me. I began to ask Dolpo to narrate how he developed his farm. I sensed he had a sharp memory as he recalled what his farm looked like 15 years ago or so. This paper provides an account of his story.

The conversion process

Dolpo began with a briefing of his history as a farmer[1]. At age forty-five, Dolpo has been farming for more than 20 years. He used to farm in Hinoba-an municipality where his family owned around 10 hectares located at the foot of the mountain. Farming was done after clearing the land through *kaingin* (slash and burn) system.

Photo 1. Dolpo and his son inspect the corn plot, just one component of the Oray family's diversified farm

The family left its farm and moved to Tapi in 1982 after surviving two arrests and more than a year of military pursuit due to allegations of underground activity with the New People's Army (NPA). Dolpo was then an active organizer of the Catholic Church's *Kristiyanong Katilingban* or Basic Christian Community, which was critical of abusive military practices. By 1984, the family relocated to Tapi where it acquired 1.3 hectares of land from Dolpo's grandfather.

That year set foot for the changes to happen in Dolpo's farm which he divides into six chronological stages as described below.

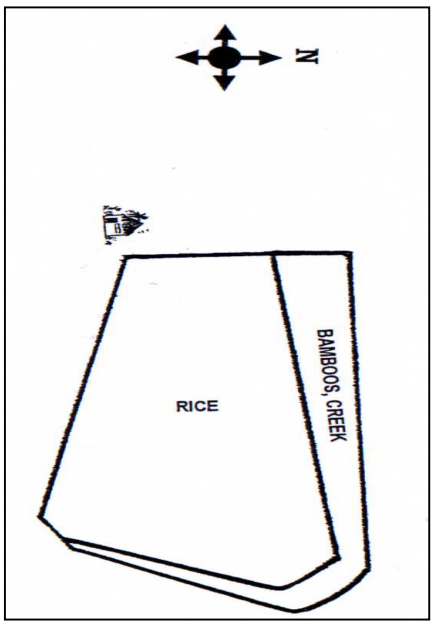
Below subsistence farming (1984-1985)

Dolpo's land originally had very poor soil. This is typical in sugar plantation areas damaged by regular post-harvest burning and chemical fertilization. Years of monoculturing resulted in soil erosion, particularly in the more sloping portions of the land.

Dolpo converted 0.86 hectare of his 1.3 hectare land to rice paddies and left the rest to bamboo. He chose not to plant sugar cane because at that time its price was at its lowest due to the sugar crisis, and the family decided that they could not rely on a mono crop harvest.

For the first two years, much effort was directed towards leveling the rain-fed land to facilitate proper water management since canals were not properly developed. This work, however, was very costly for Dolpo since he had to rent a working carabao (water buffalo).

Dolpo's rice planting was usually delayed since the neighboring farmers couldn't lend their draft animal until they finished land preparation. Failing to plant simultaneously with the community deprived Dolpo's crop of steady water and made it vulnerable to rice bug infestation. In 1984, the IR-64 high yielding variety (HYV) of *palay* (unmilled rice) was planted late and got caught by a long draught. Dolpo harvested a meager 27 cavans.



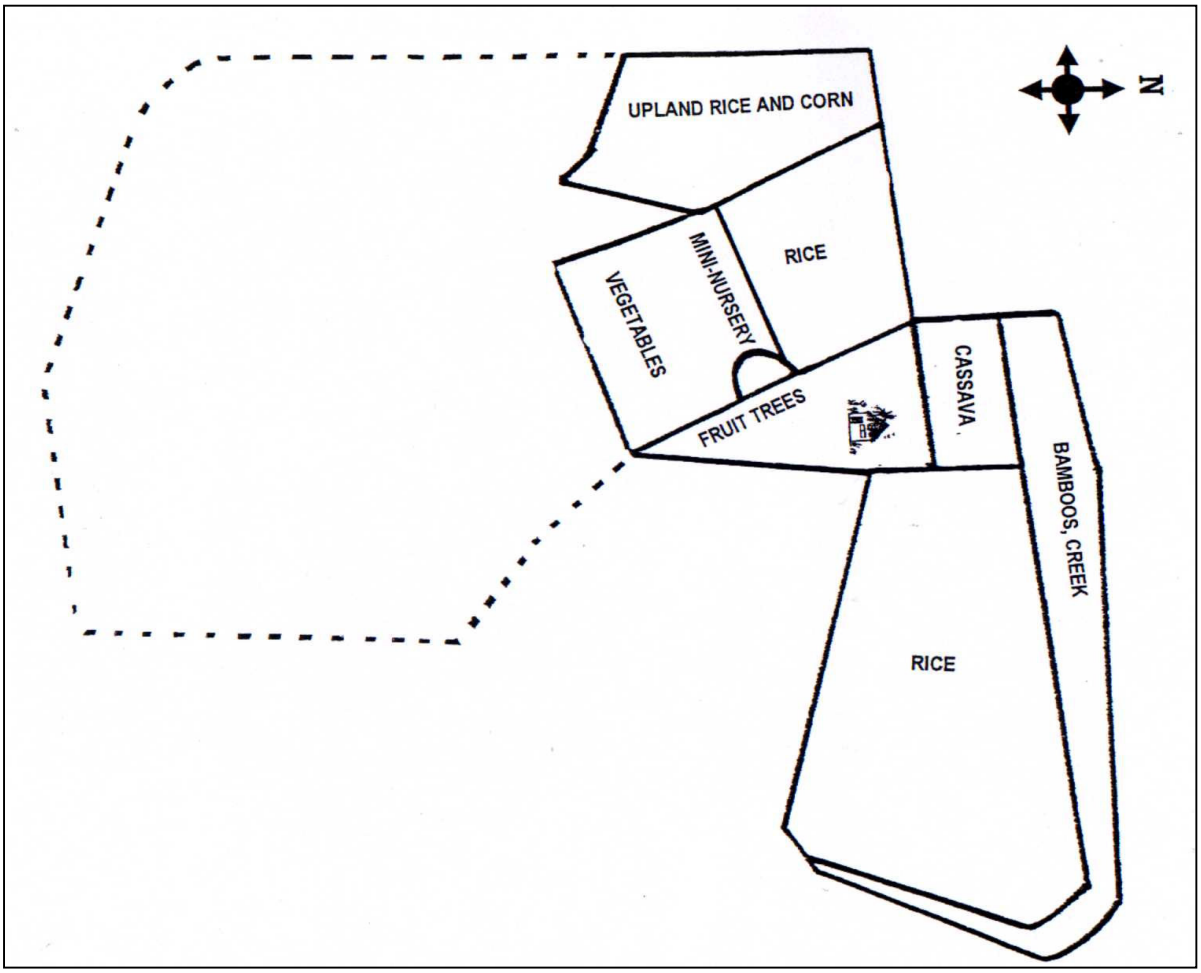
BELOW SUBSISTENCE FARMING (1985)

Since the family's income relied primarily on the rice harvest, Dolpo had to sell much of it. Yet, he found that most of the profits went to traders purchasing the crop at very low prices. In response Dolpo decided to market milled rice,

which sells for a higher price than unmilled rice, directly to his neighbors. Since the two- year land leveling did not immediately bear result, harvest was considerably unstable. Even if Dolpo stocked most of his succeeding harvest, this would only be good for four-month consumption.

The family had to make extra effort not only to secure an adequate food supply but also to save money to purchase a carabao. Dolpo knew all along that the absence of draft animal would always hamper his efforts to convert the farm. Hence, aside from producing rice, corn, some vegetables and a few livestock (one sow, a few piglets and chicken), Dolpo had to toil in a nearby sugar plantation rendering *tapas-karga* service (harvesting and hauling sugarcane) to save money to buy a carabao.

Meeting food self-sufficiency (1986-1987)



MEETING FOOD SELF-SUFFICIENCY (1986-1987)

In 1986, Dolpo and his family took over 2.2 hectares that were part of the land that rightfully belonged to his grandfather but had been encroached in the 1960's through the expansion of the sugar domain of a local landlord. Dolpo's brothers recovered the land as an aftermath of peace and order problem, the sugar industry crisis in the mid-80s, and NPA's intervention.

The acquisition brought the total farm area to its present total of 3.5 hectares. The soil types on the farm range from sandy to clayish loam and are naturally very acidic. Topography varies from steep to plain slopes with most of the ground moderately tilted. These moderate slopes often have shallow soil (one foot before reaching bedrock).

The newly acquired land had about 40 degree steeping slopes suited to upland systems with some rocky slopes inappropriate for annual cropping. Much work was required to slowly level and terrace hilly parts of the land. Close to half a hectare of rice was added to the farm's existing cultivation, raising the total rice production area to 1.34 hectares.

During these years, Dolpo's dream of having his own carabao was fulfilled. He was able to purchase a caracalf from his sale of pigs, rice and corn, but he had to continue renting a carabao until his own draft reached maturity.

Most of the new farmland was originally devoted to corn, and a significant financial investment went towards the purchase of pesticide, inorganic fertilizer and tractor service. Unfortunately, when El Niño hit in November, the corn crop failed and the family never recovered their expenses.

After El Niño, Dolpo decided to plant more perennials in the *kaingin* area where the topsoil was relatively deep. The farmer started to select planting materials that were resistant to drought and propagated these materials in his farm.

The crop expansion and diversification process proved very labor and capital intensive, forcing the family to add extra work to their routine. Dolpo stopped working as a cane cutter and hauler to concentrate on his farm. Fortunately, in 1987 his carabao was ready to work do the family did not have to pay rent for land preparation. While *dagyao* (a free and cooperative labor system) would have lessened the work involved in contouring and preparing of the land, Dolpo's friends and neighbors were also constrained by the needs of their respective farms. The Oray family was

Photo 2. The use of his carabao greatly aided Dolpo in his farm conversion. The animal performs physical tasks, and its waste is used as a fertilizer.

fortunate to get a hand from Dolpo's youngest brother, Roden, who stayed in their house during this conversion stage. With Roden's help, the Oray family planted different vegetables and root crops that had strong market demand.

In the same year, Dolpo accessed a modest loan for crop production from *Paghidaet sa Kauswagan* Development Group (PDG), a local non government organization that started organizing a number of households in the region. Through PDG, local farmers were able to access a seminar on soil and water conservation from the government-run Negros Occidental Agricultural College (NOAC). This training deepened Dolpo's understanding of water shortages and he learned techniques to use this resource sparingly.

Dolpo also began to learn about alternatives to expensive, conventional monocropping when he attended a seminar on soil and water conservation for upland farming in Cebu City facilitated by the Mag-uugmad Foundation. He learned techniques for erosion control and the importance of nutrient conservation, attended a training session on nursery management, and was exposed to other farmers struggling to combat soil loss and infertility.

Dolpo then became an active leader in a newly formed farmer's organization (Pagnanawon Agricultural Technology Development Association or PATDA), which was in a position to help farmers both technologically and financially.

As Dolpo began branching out his cropping areas, his family drew up a plan for the gradual development of the farm, including the planting of additional trees, and began to implement these changes. The cultural management of the staple crops (rice and corn) as well as of other food supplements such as banana and root crops, was improved. Additionally, the use of beans and peanuts to improve soil fertility and to allow crop rotation was expanded. With these, the family could finally reach its goal of food self-sufficiency.

Generating surplus (1988-1990)

The application of additional knowledge laid the ground for upward movement of the Oray's farm. After more than two years of hard labor, intensified diversification and integrated farming efforts, their fields no longer resembled those of the typical farms found in 'Sugarlandia'.

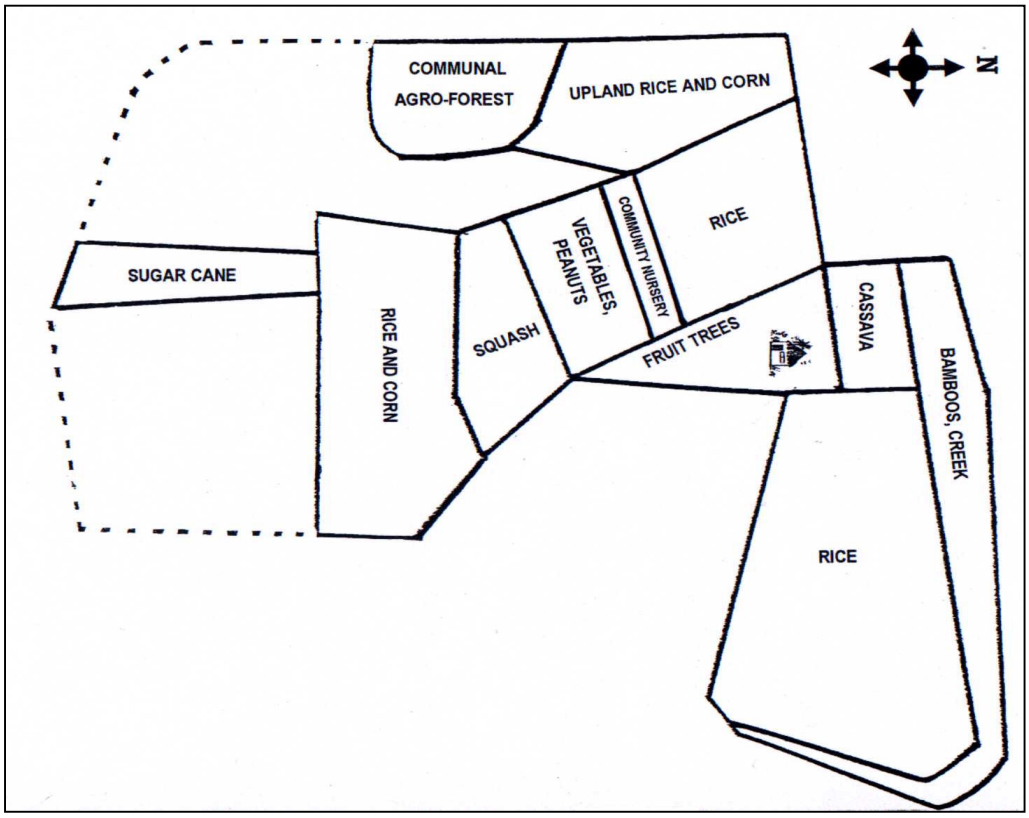
Photo 3. The Oray's current home is surrounded by a diversity of agricultural crops and trees. Contouring and tree planting help the family conserve water and reduce soil loss.

Dolpo and other PATDA members were given some on-the-job coaching by an agronomist and some revolving capital by PDG for carabao dispersal and planting materials for vegetables, forest and fruit trees. PATDA also procured additional seeds from

DENR's nursery in Mabinay, Negros Oriental and set up its own nursery. The large hilly portion of the Oray's farm was planted with commercial trees, mostly mahogany, and was established as communal agro-forest. The watering of the communal tree farm proved tedious during the dry season but was made possible through *dagyao*.

The family's vegetable farm was widened until almost 0.25 hectares of land was planted with squash. Despite a large harvest of squash, however, the price of the crop in the market was very low, and much of the yield was fed to pigs. In addition to squash, the production of peanuts was expanded (which are easy to store), and the profits from this crop were used to buy the old but bigger house adjacent to the family's homestead.

Dolpo also planted nine traditional rice varieties (TRVs) that he procured from the town of Hinobaan, which were planted in the upland portion of the farm in continuous rotation. At this time Dolpo was still maintaining the conventional IR-64 variety in the lowland, which necessitated the use of chemical inputs. Although the diversification of the farm helped to lay the groundwork for a more productive land use, the transition towards fully organic farming could not happen drastically.



GENERATING SURPLUS (1988-1990)

By combining his family's local experience and the knowledge he gained from training, Dolpo started to make organic fertilizer out of carabao dung, decomposed weeds and rice stalks. He also continued propagating his livestock. Rotation with leguminous crops (peanuts, soybeans, mung beans and sitao) was introduced as emphasized in the soil and water conservation seminar that Dolpo attended.

Because of the diversity of crops and the small size of each plot, the vegetable garden harbored few pests and diseases and did not justify the use of pesticides. Upland crops were also grown organically, with chemicals only used for lowland rice.

Since the benefits of the arduous diversification process were rarely immediately visible, it was initially difficult for all members of the family to trust in the new farming system. For instance, Dolpo's wife Raquel initially wondered if the contouring, leveling and plotting of the upland would reap any substantial dividends. She was most concerned about securing a fast and predictable harvest for her family, and worried that the diversification efforts were putting their farm at a disadvantage. Raquel also struggled to manage the farm on her own, often with little money, when her husband attended successive weeklong seminars. She recalls the time her husband had been away for a week and the rain started to pour. Raquel pushed herself to start plowing while her eldest daughter pulled the carabao.

In due time, however, trust in the diversification process grew as the efforts of all family members began to pay off. Planting pineapples along the contour lines slowed erosion on the steepest slopes of the farm. Check dams and soil traps were dug on another part of the farm and trees were planted along the contour lines. These measures were very labor intensive and could be achieved only with outside help. Different species of trees and vegetables were planted throughout the farm. A small forest was established on the steepest part of the farm that could not be cultivated. Members of PATDA worked together to help the Orays plant and water the seedlings.

Dolpo had a tough time balancing his farm chores with his increasing role in community affairs. His involvement in the sitio and barangay level matters had grown substantially. He represented the farmers' sector in the Barangay Development Council (BDC), though it became immobile in subsequent years. He also accessed additional formal training on nursery establishment and management provided by the Municipal Development Council.

In 1989, Dolpo became a founding board member of BUGANA, a federation composed initially of three farmers' associations (including PATDA), but now composed of twelve peoples' organizations (POs) from Tapi and several contiguous barangays.

PDG assisted the federation of BUGANA in preparing project proposals to access assistance from several charitable organizations. BUGANA later expanded its programs and services, particularly in marketing, technical transfer for sustainable agriculture, advocacy and paralegal services, especially regarding agrarian reform cases.

His association with BUGANA further opened doors for Dolpo to assist in the organization of other POs in Southern Negros. He also provided free training for BUGANA's neighbouring associations on matters pertaining to farm diversification and integration. In return, he gained practical knowledge from the farmers he interacted with and was able to collect different crop varieties.

In 1990, Dolpo attended a conference in Manila where he learned several new ways of dealing with the problems affecting his lowland and upland rice fields. He immediately initiated changes in his rice production techniques, which were a logical continuation of the soil and water conservation and crop diversification measures he had previously introduced in his farm. A training center for BUGANA was established on the Oray's farm, paving the way for more visits by farmers from other associations.

Adopting the MASIPAG approach (1991-1995)

PATDA and BUGANAs' link with PDG enabled Dolpo's organizations to establish contact with the MASIPAG network, and therefore, exposed Dolpo to the MASIPAG program. MASIPAG is a farmer-led network of farmer organizations and local communities representing more than 30,000 strong farmers in the Philippines who believe in the sustainable use and management of biodiversity through people's control of genetic and biologic resources, including the knowledge associated with them.

MASIPAG envisions the empowerment of small farmers and the improvement of their quality of life. It upholds a bottom-up strategy towards policy planning and decision-making, farmer-scientist partnerships, on-farm research and training, and, farmer-to-farmer technology transfer. MASIPAG adopts the following strategies to realize this goal: seed collection, identification, maintenance, multiplication and evaluation or CIMME; seed breeding; alternative pest management (APM); diversified and integrated farming system (DIFS); bio-fertilizer development and use; agro-forest development, farmers' training; project benefit monitoring and evaluation system (PBMES), and advocacy. Seed is used as tool to operate this strategy.

Photo 4. Dolpo examines his rice plants, grown according to the MASIPAG method, saving his family from the cost of pesticides and fertilizers and creating a healthier farm.

In 1991, BUGANA federation was lucky to access the 108 MASIPAG rice selections given during the first visit of MASIPAG staff in Negros. The two composite organizations of BUGANA, PATDA and TUDA 2, further divided the seeds into 54 cultivars, each to be planted in their respective trial farm.

PATDA's trial farm was established in Dolpo's farm. In their initial exposure to MASIPAG system, the work in the trial farm proved tedious and time consuming. Raquel and Dolpo recall how this collective work disrupted their daily routine. *Tanan nga plato namun naurot kay gingamit sa pagbulad sa kada 25 gramos nga humay. Daw hampanganan ka bata ang iya ubra* (All our plates were used for drying 25 grams of every rice variety. His work was like a boy's plaything), remembers Raquel.

The trial farm was a way for members of the organizations to observe and gather data about the performance of seeds in terms of their adaptability to the varied soil types, pest resistance, the number of productive tillers, length of panicles, number of filled grains, taste, smell, and other considerations. The meticulous scaling and comparing of each of the 54 MASIPAG cultivars was frustrating work but after considerable effort, the Orays had 15 rice selections for verification. The verification is another strategy for the individual farmer to test how the same rice cultivars perform in his or her own farm using the same criteria as the trial farm.

In 1992, initial production of MASIPAG seeds was done in one third of the Oray's lowland. Still, Dolpo continued mass production of high yielding varieties (HYVs) of rice

in most of the lowland portion. This meant he had to continue applying chemical fertilizer and pesticides. Dolpo thought he was not yet ready to abandon HYV because he had to wait for the results of his verified MASIPAG selections.

In 1994, three years after adopting the program, the entire of area of the Oray's farm devoted to rice cultivation was planted with the selected MASIPAG varieties. Dolpo attributed his family's shift to MASIPAG rice cultivation to the considerable harvest from their initial MASIPAG selections and the restoration of the farm's soil fertility, which made it possible to exclude inorganic fertilizers and pesticide. Since then, the Orays have rotated ten MASIPAG varieties, using at least three to four varieties every cropping season, while storing another six for subsequent rotation. Additionally, tall and short cultivars are alternated to improve biomass and organic matter content of the soil, which facilitates nutrient cycling and builds soil fertility. The family has also found that many MASIPAG selections are adaptive to upland conditions and tend to have normal growth despite modest irrigation.

As shown in the tables below, the gains from MASIPAG farming surpassed the modest expectations of the Oray family. In 1996, the family harvested 120 cavans per hectare - a significant improvement relative to the gains from HYV farming in 1992. Other than increasing yield, a significant increase in the rice income resulted from lowering expenses by at least P3,000 per hectare. This was attributed largely to eliminating expenditures on the purchase of inorganic fertilizers and pesticides. The money saved was instead used for paid labor to do harrowing, transplanting, plowing and purchase of seeds, though some of these tasks were saved by the *dagyao* system. The abundant harvest of 1996 was replicated in the following years except during infrequent periods of severe drought or rat infestation. Despite these climatic factors and infestations, production expenses continued to remain low, and the family was spared from the high monetary cost imposed by HYV farming.

Expenses
In Philippine Pesos
Years 1992, 1994, 1995, 1996 and 1998

Expenses	IRRI	MASIPAG			
	1992	1994	1995	1996	1998
1st plowing - 6 days	300	300	400	420	470
Harrowing - 1 day	50	50	70	80	-
Brushing of paddies	200	200	300	320	-
2nd Plowing - 3 days	300	420	420	-	-
2nd harrowing - 3 days	150	150	280	-	-
Rent for hand tractor	-	-	-	1,200	1300
Pulling of seedlings	400	240	480	500	500
Transplanting	600	-	350	500	-
Fertilizers (5 bags)	1,000	-	-	-	-
Pesticides (1 liter)	300	-	-	-	-
Carabao manure	-	200	-	-	-
Weeding	200	-	-	-	-
Brushing of paddies	150	50	-	-	-
Seeds	1,200	-	-	-	-
Labor - 12 days	-	-	-	-	-
Food	300	300	300	300	300
Total	**5,150**	**1,910**	**2,600**	**3,320**	**2,570**

Comparative Income Statement
In Philippine Pesos
Years, 1992, 1994, 1995, 1996 and 1998

1992	63[1] cavans x P250.00[2]	=	15,750
	Less expenses[3]	-	5,150
	Earnings		10,600
1994	60[1] cavans x P280.00[2]	=	16,800
	Less expenses[3]	-	1,910
	Earnings		14,890
1995	93[1] cavans x P315.00[2]	=	29,295
	Less expenses[3]	-	2,600
	Earnings		25,575
1996	120[1] cavans x P315.00[2]	=	37,800
	Less expenses[3]	-	3,320
	Earnings		34,480
1998	108[1] cavans x P350.00[2]	=	37,800
	Less expenses[3]	-	2,570
	Earnings		35,230

[1]Gross production less costs of threshing & harvesting
[2]Buying price per cavan
[3]For details refer to the left table

In 1994, some PATDA members had begun to set up their own MASIPAG verification plots while still planting HYV seeds. They conducted their own studies on which variety was likely to have normal growth under their farm's specific conditions. After the Oray's success, more PATDA members extended the production of MASIPAG seeds to their own plots. A number of farmers in the sitio, however, cast their doubts saying: *mapati kamo nga waay sila gagamit abono; ginabutangan nila na kun gab-i* (it's a farce they don't use fertilizer; they apply it during the night).

Dolpo ignored this statement, believing that if his neighbors conducted their own trial, they would see the results themselves. Knowing that non-PATDA members were beyond his control, Dolpo decided to just share his experience with organized farmers who were willing to listen. The Oray's high yield and breakthrough experience with MASIPAG selections motivated Dolpo to share his knowledge with other farmers.

Since 1993, Dolpo has been one of the key trainers of MAPISAN Alliance's sustainable agriculture program that promotes the MASIPAG approach. MAPISAN comprises 13 federations that are composed of almost 160 base POs in total. Close to 6,000 farmer households constitute the total membership of the alliance, which now covers 9 municipalities across the central and southern Negros Occidental, and some portions of Negros Oriental. Because MAPISAN is a member of the MASIPAG network, Dolpo has been invited to train fellow farmers as far as the provinces in Luzon and Visayas regions.

Dolpo's experience with the farmer-to-farmer training and cross visit program has boosted his confidence and improved his ability to articulate his practical knowledge and experience with MASIPAG farming approach, especially during on-site training. Some of those trainees have offered to exchange their own traditional rice selections with Dolpo. Others in attendance have asked to visit his farm to observe diversified farming systems (DIFS) in the field. The Oray's farm has become a favorite site for cross visitors from local and international organisations, particularly farmers groups'. Dolpo recalls that his PATDA organization has accommodated more or less than 50 cross visits since 1991.

Photo 5. Dolpo's rice seedlings were grown from MASIPAG seeds that, through verification, are known to thrive in the specific abiotic conditions of his farm.

As the Oray's farm has become more established, Raquel has less to worry about even when Dolpo is out of town for many days and the family is left with little money, because something can always be sold from the vegetables and fruit trees on the farm. With the success of the farm, Raquel has become used to being left alone on the farm, and finds more security in the produce the farm provides for the family.

Despite political instability, the Oray family has remained committed to their farm. From 1990-94, the military launched its "Operation Thunderbolt" in response to the expanding turf of rebel forces in the CHICKS area. This acronym stands for Cauayan, Hinoba-an, Ilog, Candoni, Kabankalan, and Sipalay towns of Negros Occidental. In the middle of 1994, although almost all residents in sitio Pagnanawon evacuated to barangay proper for fear of being caught in the middle of the armed exchange, the Oray family stayed put. Early one morning, Dolpo

awoke with his family's house surrounded by an army squad. He invited them and prepared a sumptuous chicken *tinola*. The sergeant asked why they did not leave with the other residents. Dolpo remarked: *Uma ang kapihak sg amon kabuhi. Kun dal-on ko ang akon pamilya sa* barangay proper *para ma*-safety *sila, maangkon nila ang mas dako pa gid nga problema: gutom kag buhi nga wala kasiguraduhan. Ang gamu naga-idug idog lang sa mga lugar kag madula…Madali ang tawo mainisturya sa rebelde o* military *kun busog siya.* (Our life depends on the farm. If I move my family to [the] barangay proper to keep them safe, they [will] face [a] bigger problem: hunger and [an] insecure life…Conflict moves from one place to another then vanishes. A man [can] easily talk to a rebel or military if he is full.)

Improving on the MASIPAG model (1996-1997)

For the first few years after adopting the program, Dolpo applied his course from MASIPAG as he was taught it, but as he became familiar with the techniques and gained confidence from the cross visits, Dolpo started experimenting to solve specific problems on his farm. Using his surplus income, Dolpo rearranged the layout of the family's farm to improve the integration of farm components and promote better nutrient cycling. One important change, relocating the house to the center of the farm, symbolizes the essential role of the house in the planning and monitoring of the farm. Together with his family, Dolpo can easily identify which part of the farm needs specific or priority attention.

The design of the farm continued to evolve through Dolpo's own discoveries and modification of adopted technologies and ideas obtained through farmer-to-farmer exchange. For instance, he improvised alternative pest management strategies by planting *gabi* (taro) near the rice field, which have helped control the damage inflicted by golden kuhol snails. Dolpo knew the snails like to eat *gabi*, so he tried feeding them to see if they would leave the newly transplanted rice seedlings alone. Dolpo found his prediction to be true- the pest would only destroy the rice when it had no alternative food to eat. Rice hull thrown on the paddies was also found to stick to the snail's skin and kill the pest slowly. To keep rats away from the rice seedlings, a plot of their preferred food, cassava, was planted along the paddy. Additionally, a large net was built to catch destructive pests. The catch was sometimes triturated, placed in a mesh and installed strategically in the plot so that the insects would leave due to the stench of their own kind. Planting tolerant varieties and using organic fertilizer further reduced pest pressure. Ducks were also raised on the farm to eliminate pests. Despite these

Figure 6. Dolpo demonstrates the use of a large net to collect insect pests from his rice paddies.

efforts, some infestation problems remained, though not at an alarming rate.

The soil at the farm was continuously improved through addition of organic matter. Rice straw was never burned but was allowed to decompose. Additionally, neem tree, madre de cacao, macabuhay leaves, carabao manure, soap and water were combined to form a homemade organic foliar fertilizer which was applied to infertile parts of the rice paddies and to the vegetable crops. The carabaos' shed was also transferred next to a major canal so that during the rainy season, decomposed dung and urine would naturally flow along the canals to the rainfed rice paddies. Dolpo also realised the importance of a fishpond for additional nutrients. In 1995, he made a fishpond adjacent to his duck pen.

Planting distance and seedling transplantation were also modified on the Oray farm. Unlike the 20 cm by 20 cm planting distance recommended by International Rice Research Institute (IRRI), MASIPAG's 40 cm by 10 cm or 25 cm by 25 cm planting distance was adopted. The planting distance was modified depending on the cultivar used. To avoid crowding, Dolpo switched from planting 4 to 5 seedlings per hill to only 1 or 2. Dolpo observed higher numbers of productive tillers per hill and higher numbers of grains per pinnacle.

Photo 7. Gabi is planted near rice to attract the golden kuhol snail away from the paddies.

Draining and flooding the rice paddies was performed whenever possible. Intermittent flooding is important to allow the growth and breathing of the root systems. Dolpo noticed that intermittent flooding partly facilitates a harsher microclimate that makes the plants less susceptible to pest infestations.

Additionally, transplantation of rice seedlings was extended from 25 to 30 days instead of the usual 15 to 20 days recommended by conventional agriculturists. The one-month-old seedlings are sturdy enough to withstand attack from the golden snail. The transplanted rice seedlings also have a head start over the weeds, which are controlled, in large part, by flooding.

Even the most infertile or vacant lots of Dolpo's farm became part of the development plan. These areas were kept under long fallow to enable beneficial insects to multiply in his farm. The previously slash-and-burned (*kaingin)* area of the farm was planted with different commercial and fruit trees, root crops and some legumes. Weeded grasses

were placed on top of large rocks to decompose while others were used for mulching to maintain soil moisture.

As in his previous attempts, not all these developments were easy to maintain. Dolpo realized he needed to spend more time in his fields to observe the dynamics of the farm's ecology. However, he struggled to manage his own farm duties and requests for conducting training with maintaining the communal farm and training center.

Risk management (1997-present)

Despite its diversity, the Oray's farm was seriously hit by drought caused by the 1997 El Niño effect. Many trees died including jackfruits, citrus, rambutan, *marang, lanzones,* apple guavas, *bilariba,* star apple, coffee, and others. Hardest hit were those trees growing on the moderate slopes with shallow soil. In 1998, a problem of too much water was experienced when the La Niña typhoon destroyed the fishpond.

In 1998, the family was also beset by medical problems. Dolpo underwent an appendectomy operation and had to go through six months of medication. The fifth of the children, Rey, also got sick again due to a lung problem. The following year, Raquel also had to have an appendectomy operation.

The huge medical bills forced the family to sell their two working carabaos, three pigs and some goats. Dolpo is now renting a carabao for his farm chores. While he was tempted to sell their land and to move to an irrigated lowland farm in Hinoba-an, his family preferred to stay put.

With the decision to stay at their present farm, the family is now focusing their efforts on making the farm more resistant to El Niño. Plans are currently underway to plant the most drought resistant species and to put the fruit trees in locations where they can survive severe drought. Some trees have been planted in areas with deep soil so that their roots can have access to water for the longest time possible. Additionally, vegetable cultivation has been modified to include more drought tolerant species and the time of planting has been altered to optimize crop survival.

To make up for his family's losses in recent years, Dolpo has relinquished his positions in BUGANA in order to devote more time to the farm. His resignation from the federation, however, does not change his commitment to helping other farmers, nor does it lessen his involvement with the community, as he remains the animal vaccinator of the barangay, Vice President of Parents-Teachers' Association, and a MAPISAN sustainable agriculture trainer.

Current farm situation

Below are the improved agricultural zones currently composing the **diversification** efforts on the Oray's farm. Appendix 1 provides a more thorough examination of the features contributing to the self-sufficiency of the Oray farm.

Rice paddies. Paddies were built on the lower portions of the Oray's farm. Rice is the major crop in terms of area (1.34 hectares) and income and involves the most refined management practices. Three commonly planted rice cultivars grown on the farm are 90 D *(palay damo)*, 15 improved and 22-9AN-M *(binangon malagkit).*

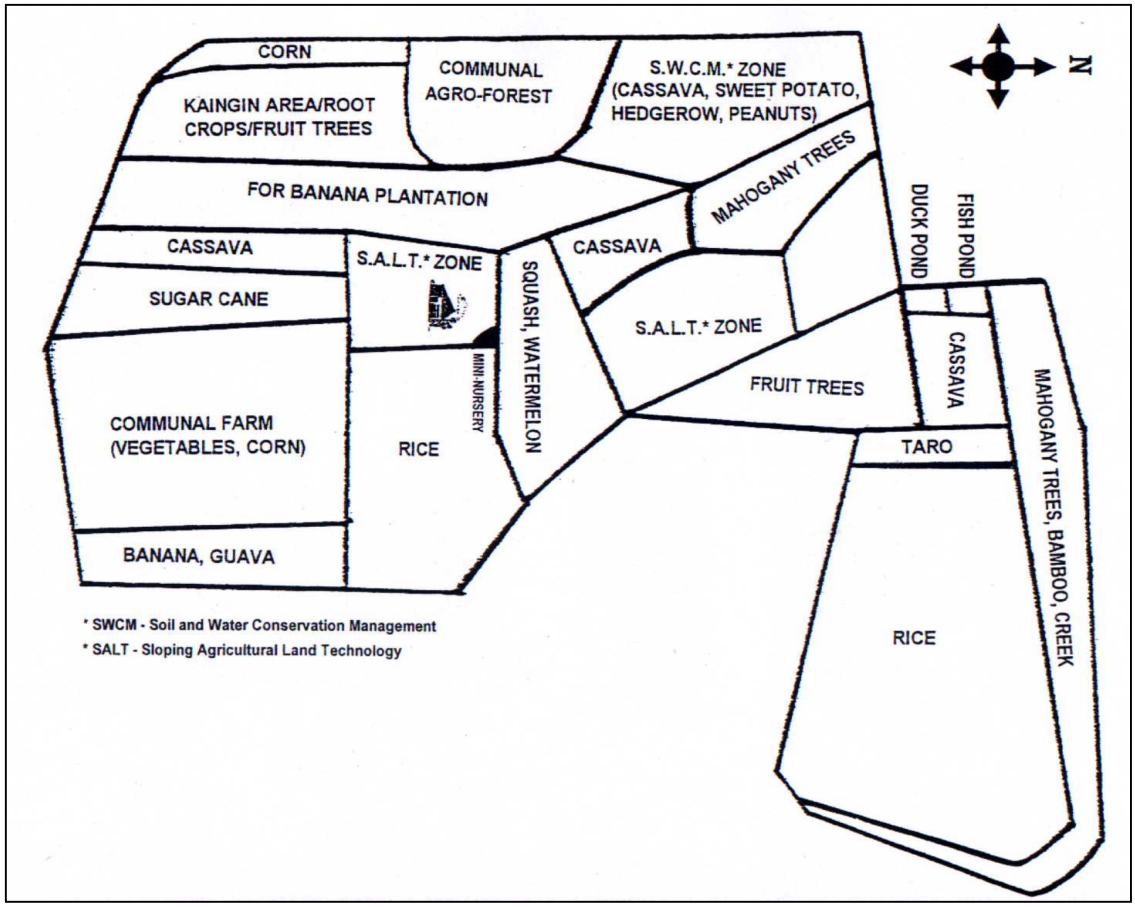
(Sloping Agricultural Land Technology) SALT Zone. Gently sloping areas around and near the house are planted to grains and vegetables grown in commercial quantity. They include okra, *pole sitao, asin pole, monggo*, squash, soybeans, eggplants and radish.

Simple contour hedgerow. Upland vegetable fields are separated by contour bounds planted with perennial food plants such as pineapple, papaya, guava, banana, and *guayabano*. The contour lines were determined using an A-frame. Pineapples were planted first because of a lack of planting material. The elevation between fields is one (1) meter, resulting in fields three (3) to eight (8) meters wide.

Contour hedgerow with check dams (Soil and Water Conservation Zone). Dikes are built around this area, and check dams are placed to slow cascading waters during heavy rains. Eroded topsoil accumulating in the dams is collected and laid back on the field. The elevation between fields is one (1) meter, resulting in fields three (3) to eight (8) meters wide.
There are about 100 pineapples planted. The land area is 0.4 hectares.

Communal tree farm area. Close to one thousand mahogany trees have been planted at the highest portion of the farm. They serve as a windbreak and watershed. The area, covering 0.325 hectares, is steep and rocky.

Sugarcane Plantation. Sugarcane is grown as a cash crop and occupies a portion of the slightly sloping area of the farm.



PRESENT LAY-OUT OF DOLPO'S DIVERSIFIED AND INTEGRATED FARM

Kaingin Area. This previously slash-and-burned area is marginal – very steep and rocky. Various vegetables for home consumption are planted in this area. Indigenous species of trees like *nato, sambulawan and aluwihaw* are also grown.

Fallow Area This area is comprised of marginal lands. With little or no intervention, weeds of various sorts grow here. It is home to a growing population of beneficial insects in the farm.

Farm Animal Area. Animal husbandry is extensive on the farm. The pigs are tied to a shelter close to the house. They are fed a ration of rice bran two or three times a day along with *kangkong* (water spinach). Other animals forage for their feed. The *carabaos* and goats are moved three to four times daily. Ducks, chicken and turkey are free ranging.

Fishpond. Tilapia, catfish and native snails are kept in a fish pond. Others are also present in the rice paddies.

Communal Farm. Corn is planted in the communal farm within Dolpo's farm. Being operated by PATDA, work in the area is done in a *dagyao* (free and cooperative) labor system by members. It covers about 0.20 hectare.

Others. Timber and fruit trees are scattered all over the farm in a relatively organized fashion. They are planted in between fields alongside annual crops. Others are on marginal areas: very steep slopes, farm boundaries and along the creek bank. Fruit trees include 50 guava, 15 papayas and more than 50 clusters of bananas.

Analysis

Based on Dolpo's narrative account, facilitating and constraining factors that surfaced during the conversion process can be identified and used as lessons for future farm diversification and integration initiatives. Appendix 4 provides an in depth analysis of the factors influencing the adoption of farm diversification and integration by other farmers in Dolpo's region.

Prior to diversification, Dolpo realized that the small size of his farm coupled with the poor quality of its upland soil was unable to satisfy his family's growing needs and contributed to food insecurity. During this time, the Oray family was convinced that monocropping is not appropriate for a small piece of land as it does not guarantee a satisfactory food supply during the lean months.

Beginning in 1986, the family discovered that their newly acquired land was not enough to bring easy access to food. The land was very acidic and lacking water due to its sloping characteristic, so they were forced to level it. It was also realized that to regain soil fertility, they had to diversify their crops and plant trees. Diversification proved to be very time consuming and labor intensive.

It was fortunate that Dolpo had his own working carabao, not only to reduce expenses in land preparation but also to avoid planting delays. Of equal importance was his decision to abandon commercial work in the sugar cane to concentrate on his farm diversification. He needed the time to facilitate the farm conversion.

In his attempt to generate surplus, Dolpo learned that diversification requires not only time and expanding food sources, but also thriftiness and more conscious farm planning. His farm development plan combined his practical knowledge with the new

technologies he learned from his trainings on soil and water conservation management and nursery establishment.

The diversification process was not without gaps because of peace and order problems that plagued most parts of Negros Occidental, especially as barangay Tapi became a hot spot for armed engagements. Although the Oray family overcame this problem, diversification was further slowed as Dolpo began attending farmer trainings. His time for the family and farm chores was greatly reduced by his involvement with PATDA and BUGANA. However, this involvement had the benefit of facilitating Dolpo's exposure to more trainings and enabled him to gain knowledge beyond farming. Through his linkage with PDG and BUGANA, Dolpo became an active organizer of farm communities as well as an able farmer trainer.

Dolpo's adoption of the strategies of the MASIPAG farming system strongly shaped his farm diversification. The establishment of trial farm and seed verification plots allowed Dolpo and his fellow PATDA members to experiment with seeds that would suit the condition of their soil. The acquisition of planting materials through the trial and verification farms also reinforced the great importance of seeds as a diversification tool. Dolpo learned that local control of seeds serves as a tool for regaining control over production systems. Because the MASIPAG seeds grow well without the use of chemical fertilizers and pesticides, the Oray family lessened its expenses, gained a larger income, and was able to eat toxin-free rice. Beyond these obvious advantages, Dolpo realized that he could use the MASIPAG approach to transform his farm. Dolpo has demonstrated that diversification is more than a mere adoption of technologies, but must also carry with it a holistic view about the natural environment and the economic and political forces that impinge upon small farmers.

Dolpo's cross-visits and the process of sharing experiences with other farmers during training and informal talks were of great importance to the farm's conversion by reinforcing the family's efforts and providing practical knowledge about farm diversification.

Although time constraints related to Doplo's involvement in organizing and training other farmers always limited the farm's conversion, the commitment of the entire Oray family to the conversion process, both in terms of planning and everyday farm duties, proved to be one of the enduring factors that helped the family improve on the MASIPAG approach.

Lessons

Dolpo's diversification and integration efforts provide valuable lessons for those who intend to begin or are at their early stages of farm transformation. There were several key factors that enabled Dolpo to largely succeed in his conversion efforts. First, Dolpo's past association with church groups and deep understanding of the prevailing system served as latent factors to initiate his farm conversion. Additionally, having previous exposure to risk management on his farm and some experience with 'formal training,' he had considerable experience from which to decide how to best manage his farm. In addition to these exposures, he also was able to access land, which is the basic resource for food security.

MASIPAG played an important role in integrating the components of the farm's conversion. It is evident from Dolpo's experience that the planting of various crops is not enough for farm diversification. Nutrient cycling and alternative pest management must also be incorporated to regain the ecological balance. Dolpo's experience also highlights the importance of a social network as a support system. His linkage with the

MASIPAG network was advantageous because its programs matched his expectations and principles. Also, Dolpo's visits with scientists and others on his farm psychologically reinforced his farm conversion efforts.

As farm diversification and integration has its own reward system, Dolpo was encouraged to continue his efforts as he and his family reaped the benefits of improved food security, increased income and better health. Dolpo has demonstrated that diversification programs like DIFS, though time consuming and labor intensive, are inexpensive and can work even without government support. For small farmers like Dolpo, this savings generation is important. The Oray family's mutual commitment to the farm also highlights DIFS as a family affair where every member has his or her own stake in the process. The involvement of the family is further strengthened as DIFS brings back the family's control over the entire production process.

Although the results of conversion are slow to be actualized, it appears to be an excellent alternative to conventional farming. Certainly not all farmers have the same zest for the arduous work as Dolpo and his family, partially because they remain psychologically trapped in the chemical-based culture of conventional farming. Dolpo admits that it is hard to get rid of the modern agricultural system that has been embraced in such a short span of time, commenting that, "*ang pinakamabudlay contour-on amo tong isip sang tawo.* (The hardest thing to contour is the mindset.)" Everything should start with a right attitude. Fortunately, the Oray's farm provides a living representation of such an attitude.

Endnotes

[1] Dolpo's farm is located at Sitio Pagnanawon, Barangay Tapi on the outskirts of Kabankalan City, Negros Occidental. An upland community, Tapi is about 26 kilometres from the city's downtown and is composed of 26 *sitios* and the village center. Its projected total population in 1999 was 8,836 (1998 Socioeconomic Profile, Kabankalan Municipal Planning and Development Office).

Tapi has its dry season from November to May and is generally wet for the rest of the year. However, occasional rainfall occurs during the dry season. The barangay is planted largely with sugarcane, a crop that dominates the province's agricultural landscape. Of the total 2,134 hectares of land area in Tapi, 52% or 1,100 hectares are devoted to sugarcane. Combined rice and corn cultivation comprises only 16% of the land area, or 331 hectares.

The single crop farming system in Negros Occidental brought about widespread famine in the mid-1980's when the sugar industry collapsed due to depressed world market prices and industrial monopoly. A majority of the more than 156,000 *sacadas* (sugar workers) in the province were left jobless. During that period, a municipal study showed that 75% to 80% of the more than 110,000 residents of Kabankalan lived below the poverty line. They were earning an average of less than P1,700.00 a month (P40: $1US).

The area became fertile ground for insurgency due to recurring problems of delayed agrarian reform and military abuses. Full-scale militarization followed as the government sought to suppress the growth of militant left wing peasant movements. Tapi was a 'hot spot' and its rice fields were turned into actual and ideological battlefields - forcing the families in the outskirts to abandon their farms and homes.

The sugar crisis began to subside in the late 1980s. By the early 1990s it was evident that farming systems diversification needed to be implemented in Negros. This need for diversification was realised even by the provincial government, which campaigned for a multi-crop farming system. The Kabankalan City government emphasized poverty alleviation and food self-sufficiency in its economic development agenda.

Still, close to a decade later, Negros Occidental has remained largely a sugarland. The will to diversify is overshadowed by rich landlords' steadfast refusal to relinquish their position as *hacienderos*. Although they continue to significantly fluctuate, sugar prices have also partially recovered due to intensive lobbying by powerful sugarlords who continue to wield significant political power in the legislative and executive branches of government. Also, the Land Bank of the Philippine's (LBP) sugar production support package has induced many agrarian beneficiaries (new owner cultivators) to continue growing sugarcane.

Appendix 1. Features contributing to the self-reliance of the Oray's farm

Crop rotation. Crop rotation is practiced to enhance soil fertility, control pests and to take advantage of the various growing seasons. For example, nitrogen-fixing crops (peanuts, mung and string beans) are planted in rotation with nitrogen-consuming crops (rice, corn and sugar cane). In addition to improving soil fertility, changing crop varieties makes plants less susceptible to pest infestation because different pests dwell on different plant species. For instance, the SALT and SWCM zones are alternately planted to cash crops including mung and string beans, peanut, corn, field beans, radish, and sweet potatoes to reduce pest populations. The first cropping for rice starts from May to June while the second cropping is from September to October. During the summer when water is scarce, rice paddies are planted to water-efficient crops such as peanuts, mung and string beans, soybeans and squash.

Nutrient flow. The farm produces all of the fertilizer it requires using nitrogen fixing crops, ground covers and leaves from nitrogen fixing tree species such as *Gliricidia*. Nutrient loss is prevented by minimizing erosion and recycling as much organic matter as possible. All that is not sold is either incorporated into the soil (crop residues, organic matter from forest, and others) composted (rice straw), or fed to animals (bran, weeds and grass), before being brought back to the fields. Nutrient losses through erosion are minimized by contour bounds and check dams, and the planting of perennials on the most sloping sites. Cover crops are also grown between planted areas to increase soil fertility while preventing nutrient losses.

Minimal inputs. Another indicator of the integration of the farm is the absence of external inputs to keep the fields productive and healthy. Unlike the conventional systems, which normally require chemical fertilizers and pesticides, organic fertilizers, botanical pesticides and beneficial insects are used as substitutes. On the Oray's farm, the only imported materials in the last three years have been seeds (in exchange with other farmers for his own seeds) and planting materials.

Few interventions for pest management. Some pest management interventions on the Oray's farm have already been described, such as the nitrogen fixing trees which fertilize the rice, the cassava which lures away rats and the *gabi* which protects rice seedlings from snails. The lack of requirement for direct interventions to control pests is another indicator of the integration or self-reliance of the farm. Ideally, pest populations are kept at acceptable levels through farm design. For example, the damage caused by a high rat population in Kabankalan City is kept at a manageable level on the Oray's farm through several practices. Root crops of cassava and sweet potatoes are planted around the paddies to lure rats from the rice. The farm's bio-diverse landscape provides habitat for a number of natural rat predators including snakes and owls, like the ground dwelling owl *morognon* that nests in *cogon* grass. The Oray's family cat also helps to control rat the rat population. Finally, Dolpo sometimes makes a bamboo rat trap using dried fish as bait when the rat population becomes economically damaging.

Other pests in the rice paddies are monitored (and sometimes deliberately trapped) using a large bamboo frame over a mosquito net used for sleeping. For annoying pests like the golden kuhol snails, Dolpo feeds them chopped taro plant for 25 days after transplanting the rice seedlings. After 25 days, the paddies are flooded so that the golden snails can have access to the young and tender weeds. Dolpo believes the golden snails are great organic decomposers, which transform plants into available fertilizer. Still, the Orays rely on their duck population to ensure that the snail population is kept under control. Many snails also die during the dry season.

High productivity. The farm is very productive as illustrated by yields exceeding 100 sacks per hectare for old paddies (newly established paddies have smaller yields in their first years of production).

Stability. Diversified systems tend to withstand extreme conditions better than simple ones. Although it suffered considerable losses, the diversity of the Oray's farm enabled it to survive the last El Niño event better than many farms.

Role distribution. Farming is a collective affair for the Oray family. Labor division provides opportunities for most members to attend to other personal and social functions.

Dolpo is responsible for ploughing, under-brushing, dike repairs and seed broadcasting. He also returns organic matter to the fields and sprays his homemade fertilizer. Raquel helps with weeding and harvesting. She is also solely responsible for the *kaingin* area after it is initially cleared by Dolpo. Except for the youngest, the children collect animal manure and bring it to the field. They also help in weeding and pest control when hand picking is involved. They do these jobs after school. The distribution of farm roles gives Dolpo time to perform his *organizational* duties such as attending meetings and conducting seminars.

The house is an integral part of the farm. The strategic location near the farm's center saves the family time and energy. Managing the household has become a collective effort. Household chores are undertaken communally. The boys fetch water, gather firewood and help clean the house. The girls assist in cooking, dishwashing, doing the laundry and house cleaning. Everybody takes turn in taking care of one-year-old Reynan.

The farm decision-making process is a conjugal matter. Farm activities are discussed every morning by the couple. When Dolpo is away, Raquel takes over farm management.

Environment. The Oray's farming system contributes to the health of the surrounding environment. On the farm, beneficial insects now thrive both because of the absence of chemicals and the diversity of the environment.

Health. The risk of chemical poisoning, an occupational hazard associated with non-organic farming, is no longer a concern on the Oray farm. The family is able to consume safer food and live in an environment far from hazardous chemicals. To cure simple illnesses like coughs and colds, costly western medication is substituted by herbal treatment by using the medicinal plants propagated on the farm. In addition,

Others. The main agronomic challenge of the farm is the lack of water during the dry season, which becomes critical during El Niño periods. In the last El Niño cycle, many fruit trees died. Dolpo and his association are currently identifying some strategies to deal with this ongoing concern about water deficiencies. The water table is about 100 feet below the surface and will require significant financing should they intend to install drip irrigation system for the fruit trees and vegetables.

Appendix 2: Profile of the Oray Family

Parents

Rodolfo Oray
Father
Born on March 11, 1955 at Barangay Magbalyo, Ka
Second of the 12 siblings
Finished first year high school at Tapi

Raquel Oray
Mother
Born in Hinobaan on November 10, 1962
Has finished elementary
Born to a farming family

Children

Rose Demin
Born on April 25, 1982
In her 2nd Year in collegel

Roselyn
Born on December 20, 1984
4th year high school student
Tapi National High School

Ritchis
Born on December 10, 1986
2nd year high school student
Tapi Elementary School

Reymos
Born on April 8, 1990
Grade IV pupil
Tapi Elementary School

Rey
Born on March 31, 1993

Reynan
Born on November 14, 1997

Appendix 3: Dolpo Oray's previous exposures and commitments

SOCIAL/POLITICAL ORGANIZATIONS

City Representative, Barangay Agriculture and Fisheries Committee, 1998
Farmer-trainor, Masipag Program of MAPISAN in Western Visayas Region, 1991-present
Chairperson, PATDA, 1990-1996
Chairperson, Sustainable Agriculture Committee–BUGANA, 1995-present
Barangay Vaccinator, 1997-present
Chairperson, Barangay Agriculture Committee, 1997
Youth organizer, Kristianong Katilingban (KK) in Mindanao, 1977
Secretary, Board of Directors, BUGANA, 1991-1994
Barangay Council Agricultural Committee representative
Founder and Organizer, Kristianong Katilingban in Hinobaan, 1979-1983
PTA president

TRAINING/SEMINARS ATTENDED

4th International Federation of Organic Agriculture-Asia Scientific Conference, 1999
Livestock Raising Training, BUGANA, 1998
Regional Alternative Pest Management and Rice Workshop, FETP, 1997
Seminar and Training on Barangay Vaccination, PVO, 1997
Seminar and Training on Barangay Vaccinators, Kabankalan Municipality, 1997
Masipag Trainors Training, Masipag, 1993
Environmental Para-Legal Training, Haribon Foundation, 1992
Agro-forestry and Cooperative Development Program, BUGANA, 1992
3rd National Sustainable Agriculture Fair, Xavier University, 1992
Seminar Workshop on Nursery Establishment & Management, DAR Region VI, 1989

RECOGNITION AND OTHER ACTIVITIES

Trainor, various trainings of MASIPAG in Western Visayas Region
Speaker, Farmer Exchange and Training Program, Regional Alternative Pest Management Rice Workshop, 1997
Outstanding Farmer, BUGANA, 1992
Speaker, 3rd National Sustainable Agriculture Fair, Xavier University, Cagayan de Oro City, 1992

Appendix 4: Prospects for replication of the diversified and integrated farming system (DIFS)

What are the prospects of replicating Dolpo's gains at least within the nearby farms of members of the 12 base organizations of BUGANA? What successes and challenges have farmers met since they adopted MASIPAG seeds?

Indicators of Success

PATDA members have enjoyed relative success in diversifying and integrating their farms, likely due to Dolpo's effective leadership, the bloodline relationship of many of the members, the proximity of the model DIFS farms, and frequent meetings among members. There is reason to be confident about a similar successful adoption of DIFS within the larger federation of BUGANA for several reasons. First, DIFS and the MASIPAG program constitute the main program of the Sustainable Agriculture (SA) Committee of BUGANA. Second, BUGANA has two SA trainers utilized by the MAPISAN Alliance and by PDG who are partly responsible for the provision of formal training to its association members. Third, the drive towards alternative farming systems by shifting from sugar cane to other crops has become BUGANA's ground for farmers' mobilization. The federation has capitalized on its members' shared struggle for agrarian reform and, probably, their political-economic orientation. Pursuit for sustainable agriculture has become a collective action, making success more likely.

The positive experience of most farmers with the MASIPAG program also encourages its uptake by other farmers. Some point to the reduction of their debts and their new independence from usurers because the production system of MASIPAG seeds is not expensive. Like Dolpo, they are also pleased to have regained the ecological balance of their farms due to their elimination of chemicals, establishment of thriving populations of beneficial insects, and efforts to restore soil nutrients. The BUGANA federation is even showcasing different varieties of MASIPAG rice in its consumer store.

Challenges faced

Despite the introduction of MASIPAG seeds to the BUGANA in 1991 and the attendance of 9 association members of the federation at different levels of MASIPAG training, the total number of farmers who have implemented DIFS is disappointing for several reasons. First, BUGANA has 301 members from its 12 base organizations and the 62 DIFS farmers are spread throughout 8 associations. These DIFS farmers make up only 21% of the total membership of the federation where MASIPAG program is strategically promoted and is expected to advance. Second, the trend of increasing adoption of MASIPAG seeds may have been curbed since its introduction to BUGANA in 1991. The low rates of DIFS adoption might be understandable if there were only two associations which were given MASIPAG selections for a trial farm and, eventually, for incorporation into their DIFS initiatives. In reality, however, the eight other associations that adopted the MASIPAG system to obtain seeds and gain DIFS training could have made more progress in their diversification efforts.

A baseline survey conducted in February 2000 by MASIPAG at the household, association and federation levels of BUGANA supplies a qualitative measure of the incorporation of the DIFS and MASIPAG programs within the federation. This survey produced several revealing findings. First, it was highlighted that within the farmers who have adopted the DIFS program, there are varying degrees of involvement. There are those farmers who have just adopted the system or just the seeds, others who have only completed the first level of MASIPAG training, and a scant number who have reached the advanced level where they can do their own breeding. Those farmers who

have implemented and improved beyond the MASIPAG program should not be confused with those who have just begun to implement DIFS. The different stages in DIFS should be further classified and emphasized in future studies.

The survey also suggested that the total number of trial and verification farms only partially reflects the achievements of the 62 farmers who have adopted DIFS. Currently, although three associations have each established a trial farm (including PATDA), only one is currently maintained. However, in addition to these trial farms, two associations have implemented nine verification plots. (A trial farm constitutes at least 50 MASIPAG cultivars while a verification plot has at least 12 MASIPAG selections.)

The survey also provided valuable information regarding land ownership and distribution. It showed that many household members of BUGANA earn their living by renting land or by engaging in several tenancy arrangements. Because the adoption of DIFS rests partially on a farmer's ability to access land, the declining trend of DIFS implementation among members of BUGANA may be traced to structures determining land arrangement. For example, 405 hectares of land currently supplies BUGANA's 301 farmers with their daily subsistence. Of this land area, 179 hectares (44%) are owned, 112.2 hectares (28%) are rented, 102 hectares (25%) are contracted to caretakers, and 11 hectares (3%) are communally managed. In one *sitio* alone, three families own most of the land, comprising more than 140 hectares. Many residents in the *sitio* are caretakers of the families' huge sugar fields, while others work for them as *obreros* or sugar cane workers. Although the successful implementation of DIFS depends largely on the initiative and knowledge of individual farmers, farmers who do not own land cannot adopt the DIFS program. Thus, inequitable land distribution may be limiting the implementation of the DIFS program, in particular, and slowing the MASIPAG movement in general.

Expensive farm inputs demanded by conventional farming systems may further prevent farmers from implementing the DIFS program. In addition to high household, educational or emergency expenses of a family, a farmer spends a considerable amount of money on farm rent, seeds, fertilizer, ploughing, transplanting, weeding, harvesting, threshing, drying, milling, bagging and hauling. These expenses may discourage farmers from adopting new and initially expensive methods of production. For instance, by sacrificing two or three crop yields in order to restore soil fertility before mass adoption of the MASIPAG farming system, a farmer might be forced into debt. Other farmers attest they cannot sacrifice many months of verifying cultivars and waiting for the regained fertility of the soil. Although the cultivar adaptability trial and the arduous demands of data gathering during and after seed verification are intended to give the farmers and their organization a better understanding of the performance of MASIPAG varieties, this seed distribution 'scheme' appears to lose attraction for some farmers for reasons of urgency. Many farmers need to respond to their immediate concerns of procuring a bulk of seeds, and cannot afford the time demand by data gathering and cultivar verification.

The potential for DIFS' replicability within the context of the BUGANA federation may be limited by the absence of a sustained monitoring effort after a farmer has undergone training. Within the federation level alone, the Sustainable Agriculture Committee has not established regular observation and on-farm coaching as part of its operational strategy. Thus, the committee may have trouble monitoring the farmers, especially if they are already verifying and consolidating their efforts after MASIPAG training. Despite the strategy of promoting MASIPAG through organized POs and rarely through the local government units, without regular monitoring and on-farm coaching, farmers are more likely to return to HYV cropping due to their exposure to massive advertisement of corporate seeds and the infusion of cash support for HYVs.

Some farmers affiliated with BUGANA choose not to adopt DIFS or MASIPAG rice production due to the intensive effort the systems require. They do not want to tediously gather and verify data as required under the MASIPAG system. As Dolpo comments, *Nasabaran sila; gusto atong hapos lang.* (They get bored; they just want [it] to go easy.) Others start massive production without verifying that the seeds are adapted to their specific farm conditions. He states that farmers are sometimes inspired to plant MASIPAG seeds not for their worth but because of a false belief that the seeds grow a *miracle rice*. He argues that this is a mistaken attitude because adoption of a new technology is never easy, but needs to be implemented in stages. Dolpo recommends farmers *amat amat* (do it gradually) by starting at verification and trying some seeds for a number of small plots. The benefits of the conversion may only be realized at the end of the entire process.

Some farmers are lured to one-time deals offered by HYV companies (buy one, get one free), leaving them with less motivation to verify MASIPAG cultivars, and eventually causing them to lose interest in organic farming. This dilemma is rooted in the conventional agricultural practice to which farmers have become adapted and conditioned. Other BUGANA members have adopted MASIPAG but continue to use inorganic pesticides and fertilizers. The introduction of an alternative system attempts to destroy the equilibrium of the conventional system that has thus far trapped the farmers. Dolpo comments that *sa kanubo sang panahon, mabudlay dulaon sa ila paminsaron ang moderno nga pag-uuma* (it is hard to get rid of the modern system they have embraced in a short span of time). Dolpo contends that in order to adopt MASIPAG, farmers must make a purposeful attempt to break away from their psychological dependency on HYVs. Dolpo believes that relative to conventional seeds, MASIPAG seeds can offer more relief because a farmer can control their storage and can access them without difficulty. To Dolpo, this means most importantly that farmers who control their seeds have control over their future.