Identification of Upland Rainforest Species in the Mount Kitanglad Range Natural Park Buffer Zone

I Background

The different intervention efforts in the Mt Kitanglad Natural Park has led to different results and further challenges for both the community and the natural environment. Some of these efforts provided results that helped the conservation of the biodiversity of the area. One of the milestones of these efforts is the proclamation of the whole area as Natural Park. However, most of the researches, biodiversity conservation projects and policy implementation met resistance from the community in varying degrees. These resulted to more pressure to the forest resources and more insecurity on the part of the community.

Identification of upland forest species in the Mt. Kitanglad Natural Park Buffer Zone was a research intended to address both the need to understand and eventually protect the biodiversity of Mt. Kitanglad while understanding the Indigenous management practices as a mechanism for biodiversity conservation. The team recognized that biodiversity conservation is also a concern of this community and that they could be players instead of being the obstacle in conservation.

The project "Identification of Upland Rainforest Species in Mt. Kitanglad", is a Bronze Category winner of the BP Conservation Program of the year 2003. It is a technical and participatory forest research on the different species of endemic trees and plants within the buffer zone area of Mt. Kitanglad. These species were identified according to their local names, their scientific names as may be available, and their known properties and uses. The project also mapped the locations and conditions of these species and the conditions of their environs along with their neighboring flora and fauna. The project also studies the interaction between the community members and the surrounding forests. Remaining forest management practices and traditions which reflect their religious belief systems were also recorded. In addition, the project aims to establish a seed collection bank and seed nursery to store and regenerate these seeds from the identified species. Further, to help the team and its local counterparts to implement the project accordingly, trainings were held to help equipped the implementers the necessary skills to implement the project.

II The Study site

Mt. Kitanglad is situated in northern Bukidnon, on the island of Mindanao, and is the second highest peak in the Philippines, with a height of 2,937 meters-above-sea-level [masl]. The upland areas above 1,200 masl remain thickly forested, with a very broad range of species and a large number of endemic plants and animals. It is considered to be a critical site in the conservation and protection of the mega-diversity of flora and fauna found throughout the Philippines.

The MKRNP is one of 10 priority protected areas within the Philippines, which is now protected by law and managed by a Protected Area Management Board [PAMB], composed of a group of National Government Agencies [NGAs] (principally the Protected Area Superintendent [PASu] of the Department of Environment and Natural Resources [DENR]), Local Government Units [LGUs], Non-Government Organizations [NGOs], and indigenous communities. The main Protected Area is surrounded by a Buffer Zone, which is further divided into different sustainable use zones.

The MKRNP falls within the jurisdiction of 8 different local governments and is surrounded by farming communities, the majority of whom are recognized as Indigenous Cultural Communities [ICCs] (belonging to the Talaandig and Higaonon tribes), although migration from the lowlands has been considerable in recent decades. Inhabitants of the area have among the lowest socio-

economic status in the country, with an average monthly household income of only PhP 1,205.40 (US$ 22.90).

The indigenous communities surrounding MKRNP traditionally practiced swiden horticulture, which had little lasting impact on the environment while population densities remained low. Now these same communities are shifting to intensive agriculture and cash cropping, as well as increasing exploitation of forest resources to meet cash needs. This has resulted in permanent forest clearance on a massive scale, leaving islands of forest in upland areas, and if unchecked will result in the complete deforestation of Northern Mindanao.

This loss of forest cover has resulted in damage to watershed areas, causing high rates of water run-off, flooding, and poor water quality, as well as rapid soil erosion and siltation of rivers and bays, and very slow regeneration of vegetation due to the loss of fertile topsoil and seed-trees. In addition, there has been a significant loss of upland biodiversity, with some tree and plant species, as well as many birds, mammals, and reptiles, becoming endangered or extinct. The government has attempted to address these problems through the promotion of sustainable forest use, such as commercial tree plantations and agro-forestry systems, and the identification, protection, and rehabilitation of protection forests.

In terms of species diversity and the variety of wildlife that can be supported, commercial tree plantations and agro-forestry systems are poor alternatives to native forests. Forests require a diverse and complex environment in order to sustain a wealth of species and a complete food chain cycle that includes larger predators. These systems are primarily intended to stabilize watershed areas, and provide a commercial alternative to the exploitation of native forests, although their direct contribution to the sustainability of upland biodiversity is small.

Due to the massive scale of deforestation that has taken place in upland areas in the Philippines, there are currently insufficient areas of forest remaining to provide a viable watershed to serve and protect society and the environment. Rehabilitation of protected forests is therefore essential, and it is considered best to replant such areas with a wide variety of endemic, non-commercial species, in order to discourage timber poaching, and to provide biodiversity protection and a habitat for endangered wildlife. However, seeds and seedlings are generally only available for species with high commercial values, and this makes it difficult for agencies involved in the rehabilitation of protection forests (as well as alternative uses such as shade trees, windbreaks, etc.).

III The Conventional Researches

Research has a significant area of influence from policy making to program implementation and therefore is one potent strategy towards biodiversity conservation. There have been different researches conducted by different academic and government research institutions that provided technical information to the environmental status and conservation needs in the upland of Mindanao.

In mount Kitanglad Range Natural Park, researches met different challenges and resistance especially from local communities who are direct and important stakeholders in the area. The Talaandig communities have, in a number of incidences, asserted their right over the territory and withheld information relevant to the researchers.

One example is the case between The Talaandig Community and the National Museum of the Philippines. This case which emanated from the research conducted by the National Museum where plants samples were collected from the Talaandig territory. This particular case was resolved through traditional means imposed by the Talaandig leaders in which the National Museum promptly complied.

The question most often raised from the field regarding technical researches is for whose benefit is the research. Most researches are seen from the community's perspective as a collection of information for the benefit of people not related or concern with the plight of the local communities. To add to this difficulties, biodiversity conservation researches implies resource protection and therefore threatening the community's access to forest resources thus alienating them from the very source of their existence. This insecurity from the community pushes them to extract resources beyond their normal rate of utilization to get ahead of the conservation efforts which is perceived to prevent them from future use of such resource. This creates conflict of interest between local community and the researchers that will jeopardize the whole intention of biodiversity conservation.

Given the favorable condition of mutual understanding for the intention of the research purpose and if insecurities be minimized if not illuminated another drawback for conventional research is the technicalities of the process. Conventional and technical researches carried out on the field were often designed by researchers and analyst in a scientific accepted approaches that are hardly grasp by local communities.

The limited technical knowledge among community members prevents them from full participation of the research. This results to low local participation and the lack of ownership for the outcome of the research. This all result to the lack of sustainability of the conservation efforts because of minimal understanding and the lack of technical knowledge to carry on the conservation initiatives of the researches.

In most conservation initiative, relationship between local community and researchers are in respondent—researcher level or as guides to areas unfamiliar to the research team. But building long-term relationship and shared commitments seldom occur in biodiversity researches.

It is now widely accepted that the conservation efforts and the researches that are geard towards conservation has to be people oriented. Institutional leaders need to support the idea of implementing participatory action research as a strategy. That require flexibility, a much greater level of trust, tolerance of uncertainty and risk, than is usual among formal leaders in bureaucracies. It also requires acceptance of shifting, varying informal leadership at different times and in different context. Viewing the team as something horizontal – with every members playing vital roles – rather than vertical leaps. (Colfer, CJP, ACM News 2003)

IV Methods used

Participatory Method

COMMUNITY MAPPING

Communities using traditional practices share among themselves the experience of the area and of many generations. In the course of their survival they have learned from their mistakes and now recognize the bounty and poverty of the land. Community understanding comes slowly through their costumes, but is scientific in analyzing what is for the best. By drawing a map of their own areas as they tell the story, the community provide a significant document that is of use both to the community and the researchers (Community Mapping manual for resource management).

Community mapping is now being widely used as a tool to gather information regarding the forest and the interaction between the community and the surrounding environment. It brings about the research team integration with the community. It allows understanding between research team and the community participants and also among community members themselves. This exercise gave insight to the team who are knowledgeable in the forest and who are the potential leaders and point individuals for the identification of the forest tree species. It also gave us an idea of

those who could relate the stories about a certain area and resources. There was a good participation from community volunteers in this activity.

Community maps contain geographical information, social, cultural, and other issues such as conflicts and boundaries. Community maps are not topographically correct unlike that of the standard government maps but they contain social and other geographical information that the common government maps do not have.

The team facilitated about 4 mapping workshops in the month of July and August of 2003. It was participated by its project collaborators as well as the local implementers of the project, the Kitanglad Volunteer Guards (KGV). The maps generated through these workshops were integrated with the technical maps by the Department of Environment and Natural Resources (DENR) for technical validation of the area. Below are the outcomes of these workshops:

FOREST CLASSIFICATION MAPPING

Since we consider that the community is more knowledgeable about the forest in their own terms than anyone of the team, we ask them to draw a picture of the present state and situation of the forest. They drew out the whole area indicating barangay boundaries, river systems, and the remaining forest. They also show the boundaries between the protected area and the buffer zone area.

As they drew the forest, they indicated the different forest classification basing from their local classification. This classification is not consistent with that of the government forest classification. Discussion also showed that the different forest types and the corresponding management practices were important to the community in order to conserve the resources therein.

The forest classifications are as follows;

Puwalas Lumuton – This forest type is equivalent to the primary forest classification of the government.

Puwalas – This type of forest was never been logged or cleared for slash and burn farming. This is still a close canopy forest but were considered as production forest by the government because people came to extract resources in these forests for local use such as round timber for house construction, herbs and different non-timber forest resources.

Kagulangan- this is a second growth forest. This is a forest type that has been cleared once in their recent history but have regenerated back to be a close canopy forest. This is also a production forest since they extract resources from this forest.

Lubas – This is a type of forest that is newly regenerated and has not reached the age of a fully regenerated forest. This is considered as regenerating forest. Most of these areas are fallow area of slash and burn farming. These areas are dominated by pioneering species and the emergence of climax species is evident though not dominant.

There are some distinctions of different sub types in the local terms such as Lubas kaanghuuran, which means younger Lubas or newly regenerating forest. This forest sub type is the youngest and newly considered forest. Pioneering species dominate in these areas and climax species are still in a seedling stage. Lubas kagulangan, as the term connotes, is a more advanced regenerating forest and very close to a kagulangan forest but not yet as fully establish as the kagulangan.

The table below shows the comparison between the local community forest classification and that of the government:

Local community forest classification	Description	Government(DENR) forest classification
Puwalas		
Puwalas Lumoton	Primary Forest	Primary Forest
Puwalas Libabaun	Old Growth Production forest	
Kagulangan	Secondary Growth Forest	Secondary Forest
Lubas		
Lubas Kaanghuran	Newly Regenerating Forest	
Lubas Kagulangan	Regenerating Forest	

INFORMAL COMMUNITY DISCUSSIONS

The awkwardness of participants in formal meetings and discussions resulted in very minimal participation on the part of the community. They merely became respondents without much grasp of the long term goals of the researches.

To eliminate the stiffness in formal gatherings, the team applied a very unstructured meetings that talks about anything under the sun. The facilitator and the whole team are aware of the important issues that might be tackled during the meetings.

This approaches provide a very relax environment and allows every participants to share anything in her/his mind. Most of the sensitive topics come out naturally and everyone welcomes any opinion or thought from any participants. There was no time limit given for anyone who would want to share during this meeting. Every participant is free to present his/her thought in whatever manner he/she wants. Everyone is assured that every thought is respected and every opinion is considered.

These meetings generated deeper understanding on the part of the team and also improve relationship between the team and the community members.

Technical Methods

SELECTION OF SAMPLE SITES

The team conducted participatory method in identification of research sites out of the forested area being studied basing on the criteria of the research. Using a community mapping and focus group interviews, The community members is given the chance to discussed and identify the possible sampling area that would fit the necessary requirement of the research study. The community draws their area basing on the river system and watersheds within their CBFM area. Then they identify forested area and the farmland and grassland. They also trace the trails and the ravines of the area. After drawing the area, the research team gave the following criteria that would best fit the research objective without breaking with the costmary laws and prohibited area. The first criterion is that the said area should be a representative forest in the area or at least the highest level of heterogeneity of vegetation. This criterion also ensures that the different forest type should be within this identified block. It should also have fairly the same vegetation as that of the other forest of the same type in Mt. Kitanglad buffer zone and that of the Barangay Basac. Second, at least majority of the identified sampling area should be accessible. This is to make sure that at least majority of the randomly selected plot site should be accessible. Third, the area should be safe for the research team to conduct the study. This is obviously for security reason.

Out of around 100 Hectares of forest cover the team will get a .5% sampling area, which is equivalent to 5 Whittaker plots. Though complete sampling of all five plots would depend on the time and resources of the team. A dry run on one whittaker plot should determine the time needed for the rest of the other plots. This will also give the team a chance to restructure the data being collected and the relevance of each information to the research objective.

When the forest type classification of the community and DENR is reconciled, the team employed stratified random sampling on these different types distributing the five Whittaker plots amongst the different forest classification.

WHITTAKER PLOTS

The Team conducted a community level training on technical forestry research. Resource persons led by the team leader and DENR personnel who are acquainted with the methodology

Participants were able to relate in topics that they were familiar with, specially the discussion on the importance of trees in their lives. Participants had a difficulty in relating to the concept of sampling as well as in any other research methodology.

Basic concepts on sampling were explained in the simplest terms as possible finding local terms and relevant relationship for the community. At the onset the facilitators had difficulty in explaining the plot method (modified Whittaker Plots) in contrast with other methods. It took time for participants to get interested to the methodology and the acceptability of result base on the methods use. It was only during hands-on or the dry run that they were able to understand that there has to be a kind of methodology in assessing the forest resources.

The technical research started with the; Identification of the Forest type through a vegetation and topographic map of the Department of Environment and Natural Resources (DENR), Stratified random sampling and establish 10 Whittaker plots, Measurement and Data collection, Data analysis, Taxonomical Identification of species and technical description. This last part of the identification was the most difficult since the team is not allowed to bring samples from the forest for taxonomic identification.

V Results and Lessons Learned

HISTORICAL PERSPECTIVE IN FOREST USE

During the Pre-colonial time, the Talaandig in the area depended on the forest and forest resource in almost aspect of their existence. The forest was the source of their food, medicine, education and recreation. Forest was the place where they performed their rituals .The forest is their life. They gathered resources just enough for their need and their needs were sufficiently provided by the forest.

As they grew in number, they adapted to a semi-settled system wherein they still practiced hunting and gathering while cultivation was done through shifting cultivation system. This practice was sustainable for a number of generations. This forest use was characterized by a profound reverence to the environment and this respect was embodied in their culture through the rituals and other traditional activities related to their use of the land. The interesting feature of this practice was the fallow period of 15 year after each planting season of rice and maize which allowed a good regeneration of the area. They also planted perennials like abaca and root crops in a minimum quantity for consumption while waiting for harvest in the new area.

Colonialization greatly contributed in the decline application of this practice through the introduction of new systems of forest and forest resource use. Permanent settlement and the introduction of religion had also cause the change in the whole system of forestland use because traditional taboos and traditional system of extraction were no longer respected. Resources were used to build houses for the settlements, chapels and other infrastructures, which is no longer based on the felt need of the Talaandig community but rather based on the need identified by the colonizers and foreign religious demands. One visible influence of the Spanish colonizers was the establishment of a 300-hectare communal ranch in the area during the early 1900s by the local people. This was maintained until the 80s when cattle decreased due to limited forage. The area was then left to regenerate.

The retreat Talaandig into the forest during the war connotes another clearing in the interior of the forest increasing the area of cultivation. These areas were Pokapok, Timago, Kinusuhan, Kitangald and Kalatungan which were continuously maintained for agriculture since then.

Only after the fire in 1983 when the community started to discuss issues relating to forest, culture and the environment. This was also the time wherein people show greater concern for the forest and the resources therein.

In 1987 the DENR's watershed program started. The program did not encourage the participation of the people from the start. The community were only hired as guides but never treated as a partner in the said program. It was only in 1990 when the government with the community made clear effort on rehabilitating and protecting the forest. This was the time Muleta Manupali Watershed Development Program (MMWDP). MMWDP started to plant exotic species in the area. The community also made their share in protecting the forest by planting more trees in their area. The most significant effort of the Talaandig community towards forest protection is through the revival of their tradition, which to them correlates with forest protection and resource conservation.

During this time, both the community and the Government made clear effort on rehabilitating and protecting the forest. This was the time when Muleta Manupali Watershed Development Program (MMWDP) was implemented. MMWDP started to plant exotic species in the area. The community also made their share in protecting the forest by planting more trees in their area. The most significant effort was also invested in the aspect of their tradition. Talaanding community started to seriously revive their culture as a means to further protect and care for the forest.
This was also the time when they applied for the Certificate of Ancestral Domain Claim

Upon the approval of Mt. Kitanglad by the congress as a Natural Park and the implementation of the CPPAP, protection of the remaining forest came into effect. All these problems of culture degradation, forest fires, in-migration, conventional farming, resource utilization and management were significantly addressed. However, it is facing the problem of how to sustain these efforts.

In 1996 the government considered Mt. Kitanglad as one of the major critical watersheds in Northern Mindanao Island. It was declared as protected area in the category of natural park. It is one of the 10 sites in the Philippines covered by the Conservation of Priority Protected Areas Project (CPPAP). It is a World Bank funded- biodiversity and conservation project (through its Global Environment Facility). What are the consequences on forest use with this declaration?

The CPPAP DENR program through its Protected Area Superintendent Unit and assisting NGO called Kitanglad Integrated NGOs (KIN) implemented projects geared towards indigenous peoples culture reorientation and integration. These projects have increased the awareness of the Talaandigs on the right to their domain. As a result, the IPs were encouraged to pursue a unified Ancestral Domain Claim. It is a territorial claim by the IPs included the Mt Kitanglad Natinal Park. This claim asserts the right of the IPs to the land as well as the resources of the domain. The claim purports the right of the IPs to be informed whatever activities that will take place the domain. Until now this is still pursued in spite of the lack of support from Local Government Unit. The claim will change the way forest would be used in the future as no activity can take place inside the domain without the approval of the holder of the claim. Non-destructive livelihood projects, one of the projects under CPAPP were also promoted in the area through planting of abaca, sweet potatoes and other non-destructive livelihood projects. These projects and activities are geared towards increasing the awareness of the people on forest protection and conservation as well as the promotion of their well-being.

The declaration of Mt. Kitanglad as protected area and the activities implemented under the CPPPAP has minimized the activities of the people in the forest. Dependency on forest products was reduced. The forest activities like hunting and gathering shifted to intensive lowland food production. Intensive planning for forest management were done by different groups or

stakeholders. Until now there is still a debate between the government group of IP advocates on who has the right to impose management plans and ultimately exercise authority in the area.

CHANGES IN FOREST AND FOREST RESOURCE CONDITION

During the pre-colonial times up to the 2nd world war, forest and forest resources were intact and sufficient for the Talaandig in the area. The forest had been the source of their food, shelter, clothing and medicine.

The increase in population and the coming of migrants mostly during the post war time greatly influenced the change of the physical feature of the forest and the condition of the resources. Most of the areas were cleared and maintained for conventional agriculture preventing regeneration of the forest. Timber resources decreased in volume due to the continuous encroachment of the population into the forest and the fire incidents that started from other villages in Kitanglad in the El Nino year of 1983. The fire destroyed most of the primary forest as well as the secondary/regenerating forest. Rattan, vines, medicines, honeys, and other non-timber resources became scarce and inaccessible for the community. Water quality as a major resource and an indicator of environmental condition also declined in quality. The community from time to time indicated the environmental degradation with the occurrence of floods and the drying of springs.

The shift from swidden to permanent cultivation had somewhat destroyed the process of forest regeneration. Agriculture, as it is practiced today in Basac, have not only prevented regeneration but continuously denuded the land with the intensive chemical inputs and extensive use of the land. Agriculture has been the major cause of environmental destruction. Today, unlike in the early days, no crop would grow without chemical fertilizers and pesticides.

Though logging has not been apparent in the perception of the people as a major culprit of forest and forest resources destruction, nevertheless it was seen as contributor to forest and culture denudation. The logging incident was just a short 6-month activity that took very little timber from the area. It was facilitated by an influential political figure in the province of Bukidnon.

The current efforts for conservation of remaining resources have been done by stakeholders in the area through identification of protected sites (biodiversity areas), buffer zones and other conservation areas. Conservation through cultural revival and empowerment has controlled indiscriminate use and encroachment to the remaining resources and the rehabilitation efforts by stakeholders started to replace lost resources. These effort, though still in the early stages, help in improving forest and forest resource condition in the area.

Specific resources that have significant changed over time were identified and analyzed by various community groups using stick distribution method. Among the resources are rattan, abaca, coffee, herbal plant, wild animals, and forest trees (See Table 1 and 2)

The women group has not seen any more rattan in the area today and has not seen any effort being done to address this lost of resources while the men group still hopes for the possible rehabilitation of these resources.

Abaca has been a good source of cash during the pre colonial until shortly after the peacetime i.e. 1970s (see table). This is due to the introduction of modern agriculture and cash crops that slowly substituted the abaca as a cash source. Furthermore, plantation crops like corn become host to a lot of diseases that destroyed abaca.

Like abaca, coffee also has a long history as a cash-generating crop for the Talaandig in the community. The significant decrease of these resources is due to the fluctuation of prices that discourage the farmer to maintain the coffee and/or the pest infestation.

Wild animals and trees are perceived to be dependent on the density and diversity of forest trees and other plant in the forest.

All of the resources, except rattan, was expected by the women group to increase in the year 2010 due to the present effort on forest conservation and rehabilitation by the community and other stakeholders.

Table 1 women group

YEAR	Rattan		Abaca		Coffee		Herbal plant		Wild animal		Forest trees	
	stck	%	Stck	%	stck	%	stck	%	stck	%	Stck	%
1920												
1930												
1940	5	20	5	20	5	20	5	20	5	20	5	20
1950	5	20	5	20	5	20	5	20	5	20	4	16
1960	5	20	5	20	5	20	4	16	4	20	4	16
1970	4	16	3	12	2	8	4	16	3	12	4	16
1980	3	12	1	4	2	8	2	8	2	8	3	12
1990	3	12	1	4	1	4	1	4	1	4	1	4
2000	0		1	4	1	4	0	0	1	4	1	4
2010	0		4	16	4	16	3	16	4	16	3	12
	25	100	25	100	25	100	25	100	25	100	25	100

Table 2 Council Of Elders and BUFAI

Year	Rattan		Abaca		Coffee		Herbal plant		Wild animal		Forest trees	
	stck	%	Stck	%	stck	%	stck	%	stck	%	stck	%
1920												
1930												
1940	5	20	5	20	5	20	3	12	4	16	5	20
1950	5	20	5	20	5	20	3	12	4	16	5	20
1960	3	12	5	20	3	12	3	12	4	16	5	20
1970	2	8	2	8	2	8	3	12	3	12	3	12
1980	2	8	2	8	2	8	3	12	3	12	1	4
1990	1	4	1	4	2	8	3	12	2	8	1	4
2000	1	4	1	4	2	8	3	12	2	8	1	4
2010	4	16	4	16	4	16	4	16	3	12	4	16
	25	100	25	100	25	100	25	100	25	100	25	100

FUTURE IMPLICATIONS

The decline of forest and forest resources experienced in the area and in the entire country caused an alarm to the community. They perceived that if the trends continue, poverty that is already prevalent in the community would continue to increase in rate and intensity. Major area of concerns that need to be addressed to effect a change in the future include cultural degradation, in-migration, forest fires, agriculture system, and resource utilization and management.

Cultural degradation is a significant factor that contributed to environmental denudation. The confusion caused by different sectors of society and different government agencies affect traditional management of the Talaandig community. Manipulation by the datus from other barangays to some community members greatly impedes the community's effort for cultural empowerment and self-determination. Thus, the community perceived that cultural recognition and empowerment of the local people is vital should we change the trends in forest condition.

Migration, on the other hand, should be controlled not only by the community but also by the government. Real devolution of power to the community is necessary to take this into effect. Declaration of area for CBFM is already a big step in preventing more migrants into the area as it limits the use of the land for agriculture and shifts it to plantation and forest rehabilitation.

Fire as a major cause of forest destruction did not start in the barangay Basac but from other areas in Mount Kitanglad. This could only be prevented by unified efforts of Barangay Basac, other communities, and of the government. Strengthening the forest protection guards and provision of necessary equipment could hasten response to this kind of calamity.

Agriculture has become the major livelihood in the area since the introduction of high valued plantation crops and high yielding varieties for marketing purposes. These crops and the package of technology that requires high input of chemical fertilizers and chemical pesticides have health and financial consequences and increased the community's dependency on the external financers. On top of all this is the environmental cost of land degradation due to the application of inorganic chemicals. Land degradation is a huge area of concern because it impacted on the physical structures of the soil and the attitudes and perceptions of the community about land and land management. It will requires a thorough analysis, continuous learning, and substantial financial support to come up and implement alternative farming practice. The effort should move the community away from modern high chemical input to conservation and organic farming which was rooted in the community's early history of land use and management.

All these concerns mentioned above require tremendous effort from community members, LGU, government agencies, and non-government institution to carry out comprehensive and holistic effort for community development and improvement of forest and forest resources.

In Search for Conservation Ethics

The team recognized that the community has its own set of norms not only for their livelihood and survival but also with regards to forest protection and biodiversity conservation. Conservation Ethic is a system of moral values pertaining to the planned management of a natural resource to prevent exploitation, destruction or neglect (Colfer JPC, Byron Y.).

Traditional systems typically contain traits and features that serves to maintain and protect natural resources and biodiversity. The existence of such traits suggests some thought processes on the part of the local people that could be described as a conservation ethics (Mustafa Agung Sardjono, Ismayadi Samoedin). Although most of these practices were modified to fit the present need, most of these were based on the traditional belief and practices. The community, with their elders and a small group of the communities take part in regulating entry of visitors to their domain, patrolling the area against illegal extraction activities, setting up monuments at sites of special cultural significance, and protecting their property rights against biopiracy with the increased interests of national and international research and commercial institutions. (H.Hartanto and C. Valmores).

The collection of data about traditional knwledge, innovation, and practices that contribute to biodiversity is a potentially important and underused mechanism for evaluating biodiversity conservation. (Mustafa Agung Sardjono, Ismayadi Samoedin)

However, local knowledge, local values and beliefs unfortunately have slowly eroded over time and many indigenous communities are now struggling to cope with the new introduced systems while trying to maintain their own local systems (from hartanto and valmores).

CONCEPT OF FOREST

In the Talaandig culture, we cannot discuss the concept of the forest without touching the spiritual and socio cultural characteristic of the community. The spiritual tradition of the Talaandig is inseparable from its environment.

The Talaandig culture recognize the forest as a source of food, water, timber, medicine and almost all the basic needs in order for a person to live. The old tradition respected the forest as source of life and that almost all of the rituals and beliefs were anchored on the forest and the environment.

Planting cycle in the past was based on the indicators they see in the forest such as the flowering of certain tree species. Hunting and other activities were also based on the natural activity of the forest.

This concept has slowly degraded through time due to the pressure of increasing population of the community and that of the lowland population encroaching into their area.

Agriculture is one of the major reasons for forest denudation and continues to become a threat to the remaining forest resources in the area. Another culprit of forest denudation is the climatic phenomena such as El Niño that most of the time creates forest fires that the community could not handle. Again this is still related to agriculture as the start of fire normally goes from burning the farmlands.

RESOURCE USE

In Talaandig culture, it is very important to understand the need in relation to resource use. They believed that Magbabaya (God) provides everything and for free. It is therefore their culture to get from the forest only what is needed and anything more than that is taboo and prohibited. There are also important features of the forest that they do not touch. Most of these are ritual grounds and historically significant object.

In the old tradition, whenever a hunter catches a deer or wild pig, he is to distribute it among members of the community equally. The same goes with other resources taken from the forest such as fruits, honey and the rest.

Talaandig community is one of the very few in this country that surprisingly did not yield to the lure of intensive logging in the past. They extracted timber for housing and for other use but never for commercial purposes.

MANAGEMENT PRACTICES

This is again characterized by two different categories as the old practice and the new. The old practice of forest management is simply by allowing the forest to be what nature would be. They only clear a portion of the forest for planting and leaving it for fallow after the season. This allows the forest to regenerate well. As the pressure of increasing population and the entry of migrants of different intention, this practice faded out and is substituted with conventional agriculture, which is characterized by large clearings and permanent farmlots.

Respect to nature as if it is living is still evident in their rituals and management practices but the continuous increase in clearings and conversion to agricultural land made it hard to allow regeneration. They still extract resources from the remaining forest for domestic use.

Due to the decline of the forest cover, government intervention came in. Planting of exotic species such as Gmelina, Acacia mangium and recently Eucalyptus species were the trees being propagated to rehabilitate the denuded watershed were some of the different projects of the government. Endemic species were not part of the government project and were not planted. The community members did not also plant these endemic trees due to their concept that they were not allowed by their culture to plant these trees. It is a taboo in this culture to plant what God had planted.

As these progressed and the realization that the effort towards rehabilitating the watershed did not materialize, instead more streams dried up and the exotic species grew poorly, the community decided to shift to different strategies.

The coming of the Project started the idea of propagating the endemic species for watershed rehabilitation. The community members consulted elder people for this intention and the consequences regarding the tradition of not planting anything from the natural forest.

VI Technical Research Result (the modified approach)

Identification of Tree and Plant Species

The first plot was established in the “pualas libabaun” (primary forest). It has a GPS reading of North 8 degrees, 03 minutes, 50.3 seconds and east 124 degrees, 51 minutes, 22.1 seconds having an altitude of 1301 MASL. From the tie point to corner 00 is 15.8 meters with bearing of N 80 degrees 00 East.

The first plot serves as dry run for the team to use the Whittaker plot method for vegetative sampling. At first the job was hard and tedious. Disparity between the local partners method and units for measurement became barriers between the team and the local partners. For instance, while its was easy for the team to measure tree height using meter tapes, the local partners prefer to use their arm span to estimate tree height. This has always been the case even in the determination of the DBH of a tree. These disparities led the team leaders to decide either to use, the traditional method and just convert afterwards or stick to the standards. These disparities however became a venue for the student team and the local partners to learn and adapt to each others methodology whichever is easy and acceptable, the better.

MODIFIED WHITAKER RESULTS

Table 1 Dominance of Plant and Tree Species in Five Forest Types

	Scientific name	Number of Individuals	Percent	Forest type				
				Type 1	Type 2	Type 3	Type 4	Type 5
Agsam		2	.40	0	1	1	0	0
Alas-as	*Pandanus luzonnensis Merr*	12	2.60	0	0	5	1	6
An-anotong		2	.40	0	2	0	0	0
Andayapot	*Abizza popluneus*	1	.20	0	0	1	0	0
Anonang		2	.40	0	0	1	0	1
Anonotong		6	1.30	0	4	2	0	0
Anotong		3	.60	0	0	0	2	1
Atyo-ay Anonotom		1	.20	0	0	0	1	0
Babangaon Isubsob		1	.20	0	1	0	0	0
Bagalbal		2	.40	0	1	0	0	1
Bagaobao	*Astronia megalantha Merr*	10	2.10	3	0	2	0	5
Bagatamaing		1	.20	1	0	0	0	0

Bagatayubo		15	3.20	1	0	0	2	12
Bago		1	.20	0	0	0	1	0
Baitog	*C. inophyllum*	1	.20	0	0	0	0	1
Balagon-uhay		1	.20	0	0	0	0	1
Balangbangan		3	.60	3	0	0	0	0
Banag		4	.90	0	3	1	0	0
Baniay		6	1.30	0	6	0	0	0
Baulaw		4	.90	0	0	4	0	0
Bitaog		5	1.10	2	1	1	0	1
Buga	*Itadaphe philippinensis*	2	.40	2	0	0	0	0
Bulagsa		1	.20	0	0	1	0	0
Buwalaw		1	.20	1	0	0	0	0
Dalungdong		3	.60	2	0	0	0	1
Dugayasan /Dugyasan		3	.60	1	0	0	0	2
Dulis		1	.20	1	0	0	0	0
Gumakaw		3	.60	3	0	0	0	0
Gasa	*C. javanica*	2	.40	2	0	0	0	0
Gawakan		1	.20	0	0	0	1	0
Gawahaw		2	.40	0	0	0	0	2
Gintawan		1	.20	0	1	0	0	0
Haanupol		4	.90	0	4	0	0	0
Hinubayan		1	.20	0	0	1	0	0
Huwag		1	.20	0	0	0	1	0
Ikog Kalagsog		6	1.30	1	0	5	0	0
Kaasin-asin		7	1.50	0	3	1	1	2
Kaasongngasing		1	.20	0	0	0	1	0
Kabaibal		1	.20	0	0	0	1	0
Kadabodabo		14	3.00	4	0	0	9	1
Kadugi		5	1.10	0	0	5	0	0
Kagalang-galang		6	1.30	0	0	6	0	0
Kagamkam		2	.40	0	0	1	1	0
Kaikog-ikog		1	.20	0	0	1	0	0
Kaiti-iti		3	.60	0	0	0	2	1
Kaitum-itum		15	3.20	9	0	5	0	1
Kalainig	*Ficus minahassae*	16	3.40	1	0	14	1	0

Kalamagan	*Homanlanthus popluneus*	18	3.80	3	0	12	0	3
Kalapat		1	.20	0	0	1	0	0
Kalaw-kalaw		7	1.50	0	0	3	3	1
Kalimog-usa		1	.20	0	1	0	0	0
Kalimog		1	.20	0	0	0	1	0
Kalingagan	*C. mercadoi*	7	1.50	5	0	2	0	0
Kalupo		4	.90	0	3	0	1	0
Kamantiya		3	.60	0	1	2	0	0
Kapasong		1	.20	0	0	0	0	1
Kasaging-saging		1	.20	0	0	0	0	1
Kasasakulab		1	.20	0	0	0	0	1
Kasin-asin		2	.40	0	0	1	0	1
Katudog		2	.40	0	0	0	1	1
Katupi		11	2.30	0	1	3	4	3
Katurog		1	.20	0	0	0	0	1
Kaulo		2	.40	0	2	0	0	0
Kaulo matianak		1	.20	0	1	0	0	0
Kulasi	*Lumnitzera racemosa Wlld*	20	4.30	5	0	3	8	4
Kulot		1	.20	0	0	1	0	0
Labugti		1	.20	0	0	1	0	0
Lagitlit		2	.40	0	0	0	0	2
Laguloy	*Pandamus gracillis Blanco*	1	.20	1	0	0	0	0
Lanagon		2	.40	0	0	0	1	1
Laupo		1	.20	0	0	0	1	0
Lumot		31	6.60	0	5	9	9	8
Lunay		4	.90	0	0	0	2	2
Maama Katupi		1	.20	0	0	1	0	0
Malabagtok		6	1.30	3	0	0	3	0
Malakibok		14	3.00	0	1	3	6	4
Pako		9	1.90	0	9	0	0	0
Pakopako		2	.40	0	0	2	0	0
Palalan		3	.60	0	1	1	0	1
Panambungol		8	1.70	0	2	0	4	2
Panglawagon		1	.20	0	0	1	0	0
Pilok Kalaw		4	.90	2	0	0	2	0

Pisayan		3	.60	0	3	0	0	0
Punglaw		1	.20	0	0	1	0	0
Putian	*Alanguiummeyeri Merr*	1	.20	0	1	0	0	0
Puyukang		7	1.50	0	0	1	4	2
Sagasa		8	1.70	0	0	7	1	0
Sagay		4	.90	0	0	0	4	0
Saging-saging		2	.40	0	2	0	0	0
Sakulab		12	2.60	0	6	1	2	3
Sakusakulab		4	.90	0	0	0	4	0
Salingsingon		2	.40	0	0	2	0	0
Salug-sog		5	1.10	0	0	4	0	1
Salungka		3	.60	0	0	1	1	1
Sampinit		2	.40	0	1	0	1	0
Talingtingan-ulayan		2	.40	0	0	0	0	2
Tanga		6	1.30	0	0	2	4	0
Tangkalubas		9	1.90	1	0	0	6	2
Tiga		6	1.30	2	0	3	1	0
Titii	*C. Philippinensis*	8	1.70	6	0	0	2	0
Tungog	*Phylloxladus hypophyllus*	1	.20	0	0	1	0	0
Ugpil-Kibaybayan		4	.90	0	0	1	0	3
Ulayan	*L.llanosi*	18	3.80	2	0	0	6	10
Uway		1	.20	0	0	0	0	1
		470	100.00	67	67	128	107	101

This table shows the tree species in found five forest types in five (5) Whittaker plots. This shows that Luminitzera racemosa Wlld locally known as "Kulasi". is the most dominant among the inventoried tree and plant species in 5 Whittaker plots at 4. 30 %.

Table 2 Top 10 Most Common Species in Five Forest Types

	Scientific name	Number of Individuals	Percent to total	Forest type				
				Type 1	Type 2	Type 3	Type 4	Type 5
Lumot		31	6.60	0	5	9	9	8
Kulasi	*Lumnitzera racemosa Wlld*	20	4.30	5	0	3	8	4
Kalamagan	*Homanlanthus popluneus*	18	3.80	3	0	12	0	3
Ulayan	*L.llanosi*	18	3.80	2	0	0	6	10
Kalainig	*Ficus minahassae*	16	3.40	1	0	14	1	0
Bagatayubo		15	3.20	1	0	0	2	12
Kaitum-itum		15	3.20	9	0	5	0	1

Kadabodabo		14	3.00	4	0	0	9	1
Malakibok		14	3.00	0	1	3	6	4
Alas-as	*Pandanus luzonnensis Merr*	12	2.60	0	0	5	1	6
Sakulab		12	2.60	0	6	1	2	3
Katupi		11	2.30	0	1	3	4	3
Bagaobao	*Astronia megalantha Merr*	10	2.10	3	0	2	0	5
Pako		9	1.90	0	9	0	0	0
Tangkalubas		9	1.90	1	0	0	6	2

DIFFICULTIES ENCOUNTERED

The team encountered different difficulties in the conduct of the technical research especially in identifying the scientific names of the trees identified by the community in their local terms. The absence of taxonomist among the team members was the first reason for this problem. There are issues between stakeholders especially between the government and academic personnel against the IPs in the area. While the teams presence was welcome in the area, other individuals from the academe and some government agencies are not welcome especially when they will deal with researches on the forest resources. Most of these personnel are those who seldom come to the community and community members were not familiar with them. Second, the community (as their agreement with other communities surrounding Mt. Kitanglad Range Natural Park) does not allow any sample of plant to be brought outside of the forest. The team tried to address this problem by asking the leaders of the bigger Mt. Kitanglad council but was not successful in acquiring permission. Instead it almost led to cultural punishment from the said body. Another difficulty is the absence of satellite signal for the reading of coordinates and elevation in most of the plots established.

VII Approaches for Biodiversity Conservation

Open discussions on the biodiversity issues brought about the awareness of biodiversity conservation in the community level. It also aids in understanding the complexities of the problems and the association of these problems with the local utilization practices without inciting a fear of deprivation to access these resources. Different perspective and approaches emerge that all intends to address biodiversity conservation issues. Realizing the need to reduce the community's dependency on forest resources most cause oriented groups and Non-Government Organizations operating in the area implemented different alternative livelihood for the community that will help them address their basic need without giving too much pressure to the forest and eventually pulling them out of the resources that is being protected. Another approach to biodiversity conservation is setting up a reforestation buffer zone planted with different fast growing species that will serve as fences for the natural growing forest. This strategy is being carried out by the government through the Department of Natural Resources (DENR) for a long time.

REDUCING COMMUNITIES' FOREST DEPENDENCY –THE NGO STRATEGY

Most people in biodiversity conservation initiatives choose to ignore local community than to deal with them, as their roles in conservation were never understood. Local community is considered as threats and pressure that encroach on the fragility of biodiversity. Thus, the usual strategy is to provide alternative livelihood—more often within the project budget—so that local community releases the pressure on the resources subject for conservation. Environmentalist and conservationist in the past have worked in luring people not to encroach the conservation area or, in come cases, remove them from the area whenever possible and when resistance is manageable.

Although most of the resources of the Non-Government Organizations came through the Government funds, especially the Department of Environment and Natural Resources (DENR), the NGOs took the lead in implementation of project that would somehow result to decrease forest dependency among local people.

Non-Government Organizations presented alternatives livelihoods and encouraged local community to engage in Non-Destructive Livelihood Systems. Conservation of Priority Protected Area Program (CPPAP) fund provided financial support for these alternative livelihoods. It has decreased dependency of the communities on forest resources and reduced the tendency of the community to commercialize forest products.

Other NGOs provided technical supports for agroforestry to improve farmer's income while conserving the immediate resources in the farm. Increase in farm productivity and the long-term soil and water quality conservation also reduce forest pressure, as opening of farms in the forest will dramatically decrease.

The efforts from the NGOs clearly show important element for biodiversity conservation. These projects recognized the poverty of local people and their high level of forest dependency. Then address the problem by diverting income-generating activities away from the forest thereby reducing the pressure.

However, considering local communities as recipient and not as collaborators of the initiatives limits commitment. The relatively short duration of these projects connotes temporary commitment and the lack of technical skills from the community led to unsustainability of the projects.

INCREASING AREA FOR PLANTATION TREES – DENR STRATEGY

The effort of government in forest protection and rehabilitation since the MMWDP in the 1990s has, in some way helped forest condition and therefore contributing to biodiversity conservation. Almost 100% of their firewood needs in the past come from the forest, which could be considered as one major resource extraction activities among local people. This is now been supplemented by Gmelina and other exotic species planted through the different projects of the DENR in the past.

Awarding Community Based Forest Management Agreement to People's Organization is the government's effort to sustain what CPPAP has initiated. CBFM's assisted plantation of exotic fast growing species was perceived as addressing the immediate need for timber in the near future. The plantation projects, financial assistance for alternative livelihood, and community resource management plans are aimed at sustaining the plans made for the conservation of Mt Kitanglad National Park.

The concept of substitution for the resource under threat gained significant successes for biodiversity conservation. These fast growing species could provide for the timber needs of the community substituting the indigenous tree species. Although, there are some difficulties encountered in the course of this projects. One is the low level of commitment in maintaining for the trees. Some people would not even plant the seedlings due to low interest and the lack of assurance for the future benefits. Another problem associated with this is the absence of land tenure creating insecurities that the government might use these plantation trees to evict the local inhabitants.

As to biodiversity conservation, these efforts also posed a threat. The high level of seedling proliferation of these species could compete with the natural regeneration and perhaps eventually dominate the area suppressing the indigenous tree species. The fast growing characteristic of these tree species could threaten the slow natural growth of the indigenous trees.

VIII Practical Conservation Efforts through the Project

Mapping of Critical Watershed for Rehabilitation

Barangay Basac is one of the communities who have felt and experienced the need to rehabilitate their forest. Unlike other upland communities who have never recognized the importance of forest rehabilitation because of too much water. Basac on the other hand experienced firsthand the problems of drought and the effects of forest denudation.

They themselves have seen and compared in their own area the difference between forested areas where the streams never dried out during the El Niño period and those that easily succumbed to few days of no rain.

They realized that they need to rehabilitate almost all watershed and water catchments areas in the whole of the CBFM site. They recognized also that this is a huge task and they needed to start with smaller areas should they want to see results. They put markings on the area they recognized as critical for environmental rehabilitation. These areas were denuded due to farming, pasture and forest fires.

The areas identified were the small catchments of creaks and small rivers in critical condition. These are: Sangkanan, Kinusuhan, Bahagan, and Kisagpa river watersheds

Establishment of Community Seed Nursery

One of the objectives of the project is to establish a community seed nursery to propagate endemic forest species. This idea evolved from the community after observation that the exotic species, which were introduced to them and recommended for watershed rehabilitation did not have good results. As a commitment of the project, the team collected the wildlings and seeds of the tree species the local partners would like to grow and plant to their respective areas.

The schedule for the establishment of the community nursery is supposedly on the later part of the project. The participants realized that it is better to collect wildlings while the team is conducting technical research in the forest. Seeds could be stored for planting in the next few months while wildlings should be planted while the research is going on. Some participants suggested making their own nursery in their farms and they need polyethylene for bagging which the team provided.

Wildlings collection

The trial collection of wildlings did not yield as expected. Community Volunteers initially chose those that are fully established wildling, thinking that it would grow faster. We then realized the smaller wildlings were better than that of the older ones because most of the roots would be intact during collection to planting. Continuous modification on the collection and management of wildlings and was tried to achieved the best results. The team and the community also realized that the period of wildling collection should coincide with the rainy season in the area that is from late May to November. Moreover, maintenance and caring for the wildlings in the nursery still need to be improved to minimize mortality rate.

IX DENR'S Follow Up

When people realized that the plantation trees brought from the lowland did not thrive well in their area, they already thought of planting the indigenous trees for future timber need of the community. However, the lack of assurance that they may be allowed to cut the trees they planted (as cutting of natural growing tree is prohibited and all indigenous trees were considered natural growing) resulted to low interest in propagation of these trees.

The project sought the assurance from the DENR that the community members planting the indigenous trees be allowed to cut and utilized the trees they planted. The DENR then provided mechanism that will identify their planted trees from the natural growth through a documentation

and periodic monitoring of these planted trees which resulted increase interest level among community members in propagation of indigenous trees. During and after the duration of the project people become interested in planting indigenous trees in their own farms. They realized the importance of these trees for their future use and were assured that they will reap from their efforts.

Perhaps the biggest achievement of this research project is the recognition made by the DENR through the Protected Superintendent Unit (PASU) and the Protected Area Management Board (PAMB) on the importance indigenous trees species for reforestation. They recognized the need for propagating the indigenous trees instead of the fast growing species (which did not really grow fast enough in the area) is more appropriate in biodiversity conservation.

After the research, the community and the DENR establish a one-hectare trial plantation for indigenous trees. The project was funded by the DENR under the PAMB and the community collectively works for the planting of indigenous seedling in the allotted area. Most of the seedlings were gathered from the forest and from the Nursery establish through the project.

Although the community is still complaining for high mortality rate and requested more training from the DENR for proper propagation management, they become more and more interested in growing these trees and tried many techniques to improve their earlier practices.

X Recommendations

While it is clear that every stakeholder has made great efforts and produced considerable results towards community development and forest resource management, it is also of great challenge that these efforts be consolidated in a more collaborative and collective action to achieve better results in the future.

One of the suggestions from the community members is to have a collective effort in the propagation of these tree species. There is a need to rehabilitate large track of grasslands especially those they identified as critical water catchments in their barangay. One strategy suggested in some informal discussion is to use the indigenous trees for agroforestry systems. This is seen to minimize soil erosion and serve as watershed while improving the quality of the soil.

There is also a need to improve propagation methods that would result to high survival rate and vigorous planting stock. More research and modification of seedling maintenance and wildling collection has to be done.

Biodiversity conservation is recognized as a very essential element of the community's survival but this requires long-term commitment especially if we are to expect better result. Commitment from academic institution for a continuous research and innovation on propagation and management of wildlings would greatly help the community improve the efficiency of their efforts and encourage more people to participate with this cause.

Government support, both technical and financial, is also necessary for the said cause. However, reforestation of large track of land using very sensitive planting materials such as indigenous wildlings could be costly than the use of plantation species. High cost of seedling preparation and high mortality rate reduces the efficiency of this strategy especially in showcasing result in a short time.

There is a great need for assistance in the reforestation of the denuded area that serves as the buffer zone of the protected natural park. This buffer zone—which is now predominantly grassland is a potential risk to the natural forest as source of fire since this is close to the farmland. There has been many incidents documented regarding forest fires starting from the farmland towards the grassland in the buffer zone and eventually to the protected forest. The

DENR had picked up from the study and started a one-hectare indigenous tree plot. However this is not enough to fully reverse the trend of environmental degradation in the area, which is cause either by human activities or natural calamities.

As for the team members left with the project and t he concern community, we would be gland to improve our skills in data collection and analysis. There is still a need to continue and consolidate the data collected for future use of more research and biodiversity conservation efforts.

Buffer zone should serve as a natural fence for the forest that we protect. Rehabilitation of these with the endemic species is necessary to further the cause of biodiversity conservation in the area.

Annex 1—Raw technical results

Table 3 Forest Type 1

	sub_plot		Total	Percent
	C	D		
Bagaobao	0	3	3	4.50
Bagatamaing	0	1	1	1.50
Bagatayubo	1	0	1	1.50
Balangbangan	0	3	3	4.50
Bitaog	0	2	2	3.00
Buga	0	2	2	3.00
Buwalaw	1	0	1	1.50
Dalungdong	0	2	2	3.00
Dugayasan /Dugyasan	0	1	1	1.50
Dulis	1	0	1	1.50
Gumakaw	0	3	3	4.50
Gasa	0	2	2	3.00
Ikog Kalagsog	0	1	1	1.50
Kadabodabo	1	3	4	6.00
Kaitum-itum	2	7	9	13.40
Kalainig	0	1	1	1.50
Kalamagan	0	3	3	4.50
Kalingagan	0	5	5	7.50
Kulasi	0	5	5	7.50
Laguloy	0	1	1	1.50
Malabagtok	1	2	3	4.50
Pilok Kalaw	0	2	2	3.00
Tangkalubas	0	1	1	1.50
Tiga	0	2	2	3.00
Titii	2	4	6	9.00
Ulayan	0	2	2	3.00
Total	9	58	67	100.00

Table 4 Forest Type 2

	sub_plot												Total	Percent
	A1	A10	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2		
Agsam	0	0	0	0	0	0	0	1	0	0	0	0	1	1.10
An-anotong	0	0	0	0	0	1	0	1	0	0	0	0	2	2.20
Anonotong	0	1	0	0	0	0	0	1	2	0	0	0	4	4.30
Babangaon Isubsob	0	0	0	0	0	0	0	0	0	0	0	1	1	1.10
Bagalbal	0	0	0	0	0	1	0	0	0	0	0	0	1	1.10
Banag	0	0	1	0	0	1	0	0	1	0	0	0	3	3.30
Baniay	1	0	1	1	0	0	1	1	0	1	0	0	6	6.50
Bitaog	0	0	0	0	0	0	0	0	0	0	0	1	1	1.10
Gintawan	0	0	0	0	0	0	0	0	1	0	0	0	1	1.10
Haanupol	0	1	0	0	1	0	1	1	0	0	0	0	4	4.30
Kaasin-asin	0	1	0	0	0	0	1	1	0	0	0	0	3	3.30
Kalimog-usa	0	0	0	0	0	0	0	0	0	0	0	1	1	1.10
Kalupo	0	1	1	0	0	1	0	0	0	0	0	0	3	3.30
Kamantiya	1	0	0	0	0	0	0	0	0	0	0	0	1	1.10
Katupi	0	0	0	1	0	0	0	0	0	0	0	0	1	1.10
Kaulo	0	0	0	1	0	0	1	0	0	0	0	0	2	2.20
Kaulo matianak	0	0	0	0	0	1	0	0	0	0	0	0	1	1.10
Lumot	0	0	1	0	0	1	1	1	1	0	0	0	5	5.40
Malakibok	1	0	0	0	0	0	0	0	0	0	0	0	1	1.10
Pako	1	1	1	1	1	1	1	0	1	1	0	0	9	9.80
Palalan	0	0	0	0	1	0	0	0	0	0	0	0	1	1.10
Panambungol	0	0	0	0	1	0	0	1	0	0	0	0	2	2.20
Pisayan	0	0	1	1	0	0	0	0	0	1	0	0	3	3.30
Putian	0	0	0	0	0	0	0	0	0	0	1	0	1	1.10
Saging-saging	0	0	0	2	0	0	0	0	0	0	0	0	2	2.20
Sakulab	0	2	1	0	1	1	0	0	1	0	0	0	6	6.50
Sampinit	0	0	0	0	0	1	0	0	0	0	0	0	1	1.10
Wail	1	3	6	3	5	2	1	2	1	1	0	0	25	27.20
Total	5	10	13	10	10	11	7	10	8	4	1	3	92	100.00

Table 5 Forest Type 3

	sub_plot														Total	Percent
	A1	A10	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	C	D		
Agsam	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	.80
Alas-as	0	0	1	0	1	1	1	0	1	0	0	0	0	0	5	3.80
Andayapot	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Anonang	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Anonotong	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2	1.50
Bagaobao	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	1.50
Banag	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	.80
Baulaw	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	3.10
Bitaog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Bulagsa	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	.80
Hinubayan	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Ikog Kalagsog	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3.80
Kaasin-asin	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	.80
Kadugi	0	0	0	0	0	0	0	0	0	0	0	0	1	4	5	3.80
Kagalang-galang	1	0	0	0	1	1	1	0	1	1	0	0	0	0	6	4.60
Kagamkam	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Kaikog-ikog	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	.80
Kaitum-itum	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3.80
Kalainig	0	0	0	0	0	0	0	0	0	0	0	0	2	12	14	10.70
Kalamagan	0	0	0	0	0	0	0	0	0	0	1	0	0	11	12	9.20
Kalapat	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	.80
Kalaw-kalaw	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2.30
Kalingagan	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.50
Kamantiya	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	1.50
Kasin-asin	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	.80
Katupi	1	0	0	0	0	1	0	0	0	1	0	0	0	0	3	2.30
Kulasi	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2.30
Kulot	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	.80
Labugti	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80

Lumot	1	1	1	1	1	0	1	1	1	1	0	0	0	0	9	6.90
Maama Katupi	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	.80
Malakibok	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3	2.30
Pakopako	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	1.50
Palalan	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	.80
Panglawagon	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Punglaw	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	.80
Puyukang	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	.80
Sagasa	0	0	0	0	0	0	0	0	0	0	0	1	1	5	7	5.30
Sakulab	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	.80
Salingsingon	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1.50
Salug-sog	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	3.10
Salungka	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	.80
Tanga	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1.50
Tiga	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2.30
Tungog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.80
Ugpil-Kibaybayan	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	.80
Wail	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	2.30
Total	5	6	3	5	4	6	5	5	3	6	4	1	9	69	131	100.00

Table 5 Forest Type 4

	sub_plot															Total	Percent
	1	A-1	A-10	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	B	B-2	C	D		
Alas-as	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	.90
Anotong	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	1.90
Atyo-ay Anonotom	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	.90
Bagatayubo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.90
Bago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Gawakan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Huwag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Kaasin-asin	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	.90
Kaasongngasing	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	.90
Kabaibal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Kadabodabo	0	0	0	0	1	0	0	0	0	0	0	0	0	2	6	9	8.40
Kagamkam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Kaiti-iti	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	1.90
Kalainig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Kalaw-kalaw	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	3	2.80
Kalimog	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	.90
Kalupo	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	.90
Katudog	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	.90
Katupi	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	4	3.70
Kulasi	0	0	0	0	0	0	0	0	0	0	0	1	0	1	6	8	7.50
Lanagon	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	.90
Laupo	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	.90
Lumot	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	9	8.40
Lunay	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1.90
Malabagtok	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2.80
Malakibok	0	1	0	0	1	1	1	1	0	1	0	0	0	0	0	6	5.60
Panambungol	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	4	3.70
Pilok Kalaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.90
Puyukang	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	4	3.70

Sagasa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Sagay	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3.70
Sakulab	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	1.90
Sakusakulab	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	4	3.70
Salungka	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	.90
Sampinit	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	.90
Tanga	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	4	3.70
Tangkalubas	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3	6	5.60
Tiga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	.90
Titii	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1.90
Ulayan	0	0	0	0	0	0	0	1	0	0	0	0	1	2	2	6	5.60
	1	4	4	4	8	5	3	7	5	3	5	1	5	12	40	107	100.00

Table 6 Forest Type 5

	sub_plot														Total	Percent
	A1	A10	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	C	D		
Alas-as	1	0	0	1	1	1	1	0	1	0	0	0	0	0	6	5.80
Anonang	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1.00
Anotong	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1.00
Bagalbal	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Bagaobao	0	0	0	0	0	0	0	0	0	0	0	2	0	3	5	4.90
Bagatayubo	0	0	0	0	0	0	0	0	0	0	0	0	5	7	12	11.70
Baitog	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.00
Balagon-uhay	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Bitaog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.00
Dalungdong	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1.00
Dugayasan /Dugyasan	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.90
Gawahaw	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1.90
Kaasin-asin	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	1.90
Kadabodabo	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.00
Kaiti-iti	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1.00

Kaitum-itum	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1.00
Kalamagan	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2.90
Kalaw-kalaw	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.00
Kapasong	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1.00
Kasaging-saging	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Kasasakulab	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Kasin-asin	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Katudog	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Katupi	1	1	0	1	0	0	0	0	0	0	0	0	0	0	3	2.90
Katurog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.00
Kulasi	0	0	0	0	0	0	0	0	0	0	1	0	0	3	4	3.90
Lagitlit	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	1.90
Lanagon	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1.00
Lumot	1	1	0	1	1	1	1	1	1	0	0	0	0	0	8	7.80
Lunay	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1.90
Malakibok	1	0	0	1	0	0	0	1	0	1	0	0	0	0	4	3.90
Palalan	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00
Panambungol	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	1.90
Puyukang	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1.90
Sakulab	0	1	0	0	0	0	1	0	1	0	0	0	0	0	3	2.90
Salug-sog	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1.00
Salungka	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1.00
Talingtingan-ulayan	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.90
Tangkalubas	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1.90
Ugpil-Kibaybayan	0	0	0	1	0	0	0	1	0	1	0	0	0	0	3	2.90
Ulayan	1	0	0	0	0	0	0	0	0	0	1	1	1	6	10	9.70
Uway	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1.00
Wail	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	1.90
	7	7	4	6	2	3	4	4	6	5	3	7	13	32	103	100.00