CASE STUDY 1: COMMUNITY BASED FOREST MANAGEMENT: THE EXPERIENCE OF THE IKALAHAN

by

Delbert Rice
Executive Officer
Kalahan Educational Foundation, Inc.
Imugan, Santa Fe, Nueva Vizcaya
Philippines

1 INTRODUCTION: THE IKALAHAN

1.1 Ancient history

The Ikalahan is one of several tribes residing in the Cordillera and Caraballo Mountains in Northern Luzon, Philippines, which are commonly, though carelessly, lumped into a so-called generic term "Igorot." The Ikalahan are not closely related to the people of the Northern Cordillera, however. They originated from the Proto-Benguet Tribe that lived in ancient times at the southern end of the Cordillera Mountains, 200 kilometres due north of Manila.

The Proto-Benguet tribe spawned four different groups, presently known as the Pangasinan natives of the salt beds, the Ibaloy natives of open lands, the I-wak natives of Owek and the Ikalahan/Kalanguya natives of the mossy oak forests. The northern portion of the latter tribe usually uses the name "Kalanguya" but the southern group usually uses the older term "Ikalahan" although the culture and language are the same. The total population of the Ikalahan/Kalanguya is about 49 000.

1.2 Recent history

All of the mountain people of Northern Luzon have been the victims of unsustainable development for the past several centuries. Occasionally the affected people have simply moved back into the forests or accepted resettlement and abandoned some of their resources, but not always. In 1974 the Kalinga and Bontok people reacted so persistently and violently against the proposal to build a series of hydroelectric dams along the Chico River that the government cancelled the entire programme. This was not done, however, until after many people were killed.

In 1970 the Ikalahan faced a similar problem when 6 300 hectares of their tribal lands, were scheduled to be the site of a new vacation centre. Although tempted to react violently, the Ikalahan finally decided to do their fighting in the courts and offices using paper instead of knives and bullets. After many meetings, hearings and consultations, and with the help of two dedicated lawyers, they won their case.

Comment: Soc.ec

Their legal victory in 1972 voided the claims of the outsiders but still did not provide any legal land tenure for the Ikalahan. This defect was finally solved in 1974 with the signing of an agreement between the Philippine Government, represented by the Bureau of Forest Development, and the Ikalahan people, represented by the Kalahan Educational Foundation (KEF), a corporation which the Ikalahan organized and registered for that purpose. The agreement was simply labelled Memorandum of Agreement # 1 (MOA # 1) because it had no precedent.

This MOA established the Kalahan Agro-forestry Development Project and provided exclusive tenure over 14 730 hectares of ancestral lands in exchange for protection of the watershed. Approximately 2 500 of the Ikalahan now live within that area, commonly known as the Kalahan Reserve.

Comment: socio-ec/governance/ perhaps planning process?

1.3 The Kalahan Reserve

The Kalahan Reserve includes nearly 15 000 hectares of steep mountain lands between 600 and 1 700 meters above sea level. It is located at 16 degrees north latitude and 120 degrees east longitude in Northern Luzon, Philippines. Refer to Map 1. The area is dominated by Mount Akbob (1 658 meters), sometimes called Mount Imugan, in the approximate centre of the Reserve, Mount Bantay Lakay (1 717 metres), located in the southern portion, and the ridge that connects them. The ridge serves as the basic watershed division for the Reserve. The western portion is covered with Benguet pine (*Pinus insularis syn P. kesiya*) and grasslands while most of the eastern portion is covered by dipterocarp forests.

Map 1. The Kalahan Reserve, Philippines

The central ridge is covered with mossy forests, mostly scrub oak. Biodiversity is high in all of these areas.

The soil in the entire Reserve consists of a thin, acidic topsoil overlying fractured, igneous parent material. These soils are well drained and, if protected from erosion, are suitable for vegetable and root crop production. Much of the forest cover is interspersed with small swidden farms.

The rainfall is heavy, above 3 000 mm per year which mostly falls during the typhoon months June through September. The climate is cool with temperatures averaging about 20^{o}C but sometimes reaching as low as 4 degrees. It seldom gets as high as 28^{o}C. Because of the high rainfall, the humidity seldom, if ever, falls below 85 percent.

Typhoons are frequent and an active geological fault line, known as the Digdig Fault, separates the eastern and western portions of the Reserve. A major earthquake occurred in July of 1990. Its recorded intensity was significantly above 8.0 on the Richter scale and caused a horizontal shear displacement of more than 5 meters. Damage to the environment was severe although not as severe as in adjacent areas which had been more seriously deforested prior to the earthquake.

1.4 Culture and traditional technologies

Although originally hunters and gatherers, the Ikalahan have been swidden farmers for at least two centuries. The most highly developed technologies are related to the production of camote (*Ipomea batatas)*, which is the basic food. The system of crop rotation and forest fallow enables the farmers to cultivate a new field when the fertility is proper for cultivation and then fallow it again before any significant erosion takes place. Each cycle is traditionally about 17 years and, when done properly, is sustainable indefinitely. These technologies are supported by social mores, taboos and other cultural customs. The production of ginger (*Zingiber officinale*) is also controlled by an intricate technology which, like camote production, involves an extensive vocabulary not known to the adjacent tribes.

Comment: Socio-ec

The Ikalahan also have extensive skills in various types of handicrafts, especially those using rattan, bamboo and wood. A few men have become skilled blacksmiths making various types of knives and digging tools for the women to use in the fields.

Although the Ikalahan originally lived in small groups of 3 to 5 houses, they have recently begun to gather their residences into larger villages. The primary cause of this change was probably the fact that children's education became a felt need. The culture of the Ikalahan is more community centred than family centred and although family ties are strong, they seldom lead to extended families living within one house.

The largest community of Ikalahan is Imugan near the centre of the Kalahan Reserve. It now has 125 houses compared to 17 in 1965. The other communities within the Reserve, in descending order of population, are Malico, Baracbac, Unib and Bacneng. Outlying hamlets of these communities are scattered throughout the Reserve, particularly in the flat area and along some of the major rivers.

2 THE KALAHAN PROGRAMMES

2.1 Beginnings

Memorandum of Agreement # 1, which established the Kalahan Reserve, is a goal-oriented document. The goals were clearly stated but nothing was said about how the goals were to be accomplished. This orientation is ideal for such agreements because it respects the wisdom of the participating community and encourages the community to be both responsible and creative in planning and implementing the programmes.

Comment: Planning process

After entering into the Agreement, the tribal leaders immediately began working on the protection of the watersheds because this was explicitly mentioned in the Agreement. The Ikalahan leaders first brought wildfires under control through a combination of punishments and rewards. Farm lots of all residents were also delineated and mapped and simple maps and agreements issued to each resident. The Board of Trustees and the individual farmer both signed the agreement so that each family would know exactly which areas it was responsible for using and protecting. These subdivisions were based on ancestral claims and any disputes were settled by community conferences. No family was allowed to claim more than 15 hectares.

Comment: operation

Comment: /governance

The next important programme was improvement of food production capacity. Although camote is produced on the slopes, very little cultivation is needed and the leaf cover is so thick that there is very little chance for erosion, even during the frequent heavy rains in the area. A controlled research project was conducted over a decade ago, which demonstrated that there is no significant difference in either the quantity or quality of erosion between a well-developed camote field and a good second growth forest.

Various ways to improve the production of camote were studied and the most effective methods implemented. As a result, the productivity of the farms improved enough to release more than 1 000 hectares from the agricultural cycle and let them remain as either protection forests or production forests. The production of vegetables for home consumption was also encouraged. At one time the possibility of utilizing other crops for carbohydrate production was explored but none of them met the requirements of high production with soil protection as well as camote.

It was only at that time that attention was turned to the production of cash for additional family support. Many things were tried and, as a result, many things that were unsuited to the local situation were discovered, including vegetative terracing using Ipil-ipil (*Leuceana leucocephala)*, raising of dairy cattle and goats, processing of vegetables and marketing of hand-woven cloth and soft brooms.

This long period of trial and error was probably necessary to enable the Ikalahan to study the resources and develop a philosophy and the current concepts concerning development. It also gave the community sufficient time to train young people to directly manage the programmes.

2.2 Development Philosophy

After the Ikalahan had learned more about both the resources and the markets, holistic concepts to govern future developments were developed. The basic development philosophy includes four basic principles:

1. Old-growth forests, all of which are located in critical watersheds, shall be protected.

The Board of Trustees early on declared about 400 hectares of the ancestral lands “Watersheds” and unavailable for agricultural purposes. The Trustees later changed the designation from Watershed to Sanctuary to also protect the wildlife. This area has since then been expanded and now covers approximately 4 000 hectares.

2. All other areas within the Kalahan Reserve are also recognized as important watersheds. Many of them are available for agriculture but the farmer must protect the soil from erosion and maintain a maximum of vegetative cover.

The Board of Trustees intends that all private lands within the Reserve (approximately 480 hectares in 4 areas) should also be managed in the same way. There is no legal way for them to enforce this policy but social pressures have been partially effective.

3. The community should attempt to process its resources and sell finished or semi-finished products rather than raw materials.

This policy will maximize employment opportunities in the community for educated youth and should ensure the availability of educated leadership in the future.

4. Chemical pesticides and fertilizers and all other agricultural chemicals are banned within the Kalahan Reserve.

The Board of Trustees and the Local Government Officials established that policy in about 1991 as a result of a series of ecology seminars, which were conducted within the Reserve by the staff of the KEF.

Comment: planning processes

3 MANAGEMENT OF WOOD AND NON-WOOD FOREST RESOURCES

3.1 Niches

As the community members gained more experience in managing their resources a concept called "Niches" was developed. Simply stated, the KEF seeks to identify ecological niches in their natural environment that can be utilized sustainably by local people as economic niches. The primary ones, which have been identified and which are based on forest resources, are listed below.

3.2 Harvesting, processing and marketing of forest fruits

3.2.1 Raw materials

The KEF began processing wild fruits as a sideline to the processing of milk and vegetable products. They soon stopped processing of milk and vegetables but continued to manufacture guava jelly from wild guavas *(Psidium guajava)* because it was found to be both profitable and protective of the forest resources.

Comment: socio-ec, forest goods & services

Other guava jellies were available in the market at the time the programme started but none of them were of high quality so it was not difficult to produce a superior product. After a period of time, however, the processors felt disturbed by the amount of waste that was developing and so they produced a guava jam and guava butter to utilize more of the raw materials. This reduced the waste to a manageable amount but even that waste was eventually turned to good use when the KEF established a piggery nearby to produce fertilizer for the gardens. The small amount of waste supplemented the other hog feeds.

The processors also discovered how to process a wild fruit known as "dagwey" (*Saurauia bontocensis)* to make a product similar to raisins, which is good for snacks, salads and baking. As with guavas, the processors eventually developed three products from the dagwey fruit to keep the amount of waste minimal.

Comment: forest goods & services

Because dagwey was formerly a weed tree, no one had protected it. When its value was discovered an inventory was made and only 2 000 trees were found remaining in the Reserve. The KEF Agro-forestry Team, therefore, studied the species and discovered how to propagate it and promoted the planting of it. A total of 8 000 additional trees have so far been planted in various parts of the forests since the dagwey is a forest tree and does not grow well in plantations.

Comment: operations

The food processors next used the local *imugani* variety of Ginger *(Zingiber officinale)* to produce ginger jelly. It has developed a very satisfactory niche in the market.

Having learned enough about the jelly technology to make superior products, the KEF decided to expand its activities to process other fruits such as bignay (*Antidesma bunius*), santol (*Sandicorum koetjape*), dikay (*Embelia philippinenses*), Hibiscus and Malvaviscus. All fruit processing have the same aim, to produce a superior product without chemical additives.

Comment: forest goods & services

Passion fruit (*Passiflora edulis*) juice is also being made. The amount of juice in each fruit is very small so the final product is quite expensive but it enjoys a good market anyway.

Comment: forest goods & services

The KEF has planted appropriate fruit and berries in order to increase its raw materials. Most of these are either inter-cropped in areas that have only scattered forest trees or are placed in small orchards in barren portions of the Reserve. Both private persons and KEF staff have now planted a variety of fruits and berries. Four fruits: Lemons (*Citrus limon),* limes *(Citrus latifolia),* blackberries *(Rubus occidentalis)* and the native variety of pineapple, have recently begun to bear fruit and the recipes for them have been prepared.

Comment: forest goods & services

3.2.2 Markets

The first small output of the Kalahan Food Processing Center was sold to personal friends. This was satisfactory for a brief time but the number of personal friends was limited. The first entries into commercial markets were admittedly not satisfactory. When the KEF later consulted with professional entrepreneurs about markets it was told that it would have been much wiser to study the market first and then produce the product to match the market. What the KEF had done, in fact, was the reverse. It has produced the products first and then searched for the market. The KEF had made a mistake, perhaps, but an understandable one.

When the KEF contacted a professor at the Asian Institute of Management, he assigned one of his classes to take samples of the products and undertake a market analysis. The results of that study changed the KEF programme entirely. It showed the KEF that its market niche was definitely the A & B (the elite) segments and that those customers wanted to buy their jams and jellies in the super-markets where shopping was less time consuming and impulse buying was encouraged.

With that information, the KEF could focus its activities and design its packaging, labelling and promotions with the specific market in mind.

It was also discovered that the Ikalahan people are, by nature, much too shy to be able to properly service the A & B market. The KEF, therefore, worked with several other NGOs to establish a marketing arm that could market the products of the KEF and of the many other upland communities that were having the same trouble. That marketing arm employed marketing professionals to do the marketing. They receive 20 percent royalty on all sales, which is significantly less than the salaries of KEF's former sales personnel and has resulted in an increase in sales of more than 500 percent.
The marketing people must still "educate the market" because several of the products, notably dagwey and dikay, are still unknown to the ordinary consumer.

Comment: socio-ec

It has also been observed that the usual newspaper and television advertisements, which are effective with the C & D market segments, are not effective with the A & B market. Feature articles, on the other hand, are very helpful and sales have improved whenever the KEF brand name, Mountain Fresh, has been featured in a newspaper or magazine article.

Another effective means of promoting new product lines has been to conduct taste tests in various super-markets. The markets charge for the privilege but the merchandisers have observed a 10 to 20 percent sales increase following each promotion.

An analysis of the major competition for Mountain Fresh products is very encouraging. One major producer controls nearly 70 percent of the market for jams and jellies but 50 percent of its customers are not satisfied with the products they are buying. This means that at least 35 percent of the total Metropolitan market is waiting for a superior product. That major producer is not likely to fight the Mountain Fresh line of products, however, because its major products are pickles, mayonnaise and sandwich spread, not jellies and jams.

The KEF aims to capture 10 percent of the Metropolitan Manila market for jams, jellies and preserves. That is a reasonable goal because it is only a third of the present group of dissatisfied consumers. When this goal has been reached it will be necessary for KEF to have two shifts of workers in the Center for at least a part of the year. That level of operations should produce enough profit to subsidize the educational and other non-profit service activities of the KEF.

Obviously, the A & B market insists on high quality products. The Ikalahan have always produced high quality handicrafts so this was not a difficult concept for the people to absorb. The need to standardize the products, however, was initially a challenge.

Comment: issues

3.2.3 Community impact

Approximately 100 families from within the Kalahan Reserve and a few from outside of the Reserve earn a significant portion of their family income by selling fruit to the Food Processing Center. This has had a significant impact on the life style of the community.

Comment: socio-ec

Formerly each family would have a rather large swidden farm, only half of which was intended to provide food for the family. The other half was intended to provide the family with cash income. Now that the residents obtain their cash from selling wild fruit, it is possible for them to reduce the size of their swidden farms. This has had a very positive effect on the watersheds and overall quality of the forests.

The programme also created a greater interest in the forests themselves. People have become more curious about other possible products within the forests and less interested in cutting down sections of the forests for agricultural production.

Comment: concl

3.2.4 Profitability

The Food Processing programme has not yet become profitable. There seem to be three major problems which inhibit its profitability but all three of them are seen as temporary.

Comment: issues

Problems

The transportation of the products to the major markets in Metro-Manila, is expensive. Sales are not yet large enough to keep the vehicle fully loaded when deliveries are made. This makes the unit cost for transportation quite high.

Comment: issues

The cooks are all local women who are well trained and enjoy appropriate salaries. They are not yet fully employed in making finished products, however, so they spend a considerable amount of time washing bottles and doing other cleaning tasks. Those common tasks will be done by students and other less expensive workers when the market increases. That will further reduce the unit costs of production.

In spite of the fact that the Philippines is a sugar producing nation and the world price of the product has not increased, the price of sugar in the local market has more than tripled in the last three years.

Comment: issues

The Food Processing Project must use large amounts of sugar but it has not been able to pass on the increased costs to the consumers because of the hesitance of the purchasing officers in the super-markets.

Solutions

The market promotions such as taste tests and feature articles are the most direct approach to increasing sales. These are already underway and sales are increasing at between 20 percent and 25 percent each year.

Another way of reducing the transport costs is through encouraging farmers to produce organic vegetables (carrots, lettuce, cabbage, beans, cauliflower, peas, etc.) for the Metro-Manila market, so as to fully utilise the vehicle and share the costs.

To overcome the increase in price of sugar, the Food Processing Center recently developed a line of “low sugar” products. These are less expensive to produce and also attract a new market segment, namely the health conscious people who appreciate jellies and jams but avoid sugars. Gross sales should, therefore, increase significantly while unit costs should decrease.

The Food Processing Center can increase the number of flavours in its line. A number of suitable plants have already been planted in various parts of the Reserve. Although three of these are new plants to the area, they are closely related to indigenous plants and have been found suitable to the

environment. They are being planted in scattered areas within the forests to avoid the dangers inherent in mono-cropping.

Comment: opps

The customers for these new products will probably not be drawn from among the present customers of the other Mountain Fresh products. Most of the customers for the low sugar line will be new consumers who are not even patronizing the competition. When the new Mountain Fresh products reach the market, gross sales should increase rapidly and the total programme should enjoy a healthy profit.

3.2.5 Sustainability

Most companies would consider such a programme sustainable if the supply of raw materials could be proven to be sustainable. In the case of the KEF, however, this would not be adequate. The KEF requires that the total environment from which the raw materials are obtained must also be sustainable.

The guavas and other wild fruits, which the Food Processing Center is using, are also food for various wild animals, birds and insects. The KEF must, therefore, limit its harvest of such fruit so that the wild fauna can also thrive.

Comment: issues

To determine whether these requirements are being met, the KEF foresters analyzed the fruit production in the forests of the Reserve. Sample plots of wild fruit, such as guavas, were identified. Each sample plot is about 1/4 hectare in size. The number of fruit trees in each sample plot was determined by simple counting. The average output of these trees was also computed by averaging the output of a large number of trees from various sample plots. This enabled the staff to estimate the average output of fruit per hectare.

The foresters also did homogeneous blocking of the forested areas of the Kalahan Reserve and from that they could compute how many hectares of guavas were actually growing within Reserve. A simple calculation then gave them a good estimate of how many tons of guava fruit are produced within the Kalahan Reserve each year.

The Office Team checked the cash vouchers covering fruit purchased by the Food Processing Center. These totals revealed the number of kilos of guavas that were harvested during the year for use in the project. Another simple calculation told the administration what percentage of the production was being utilized by the Food Processing Programme.

The same type of study was made for every fruit being harvested and processed. In each case it was discovered that the Center was only using about 10 percent of the available fruit. Ten or even 15 percent is surely too small a demand on the natural production to endanger any part of the ecosystem. The production of raw materials for the Programmes is clearly sustainable even while it is protecting the total ecosystem.

In the case of guavas however, it was recently realised that the 10 percent was being passed and that the market was still growing. Since it was known that it would take 3 to 4 years for new trees to begin to produce fruits, high quality seeds were collected and planted in the nurseries straight away. The plants are doing well and will soon be ready for enrichment planting in the forest. They should be bearing fruit before the 15 percent level is reached, bringing the harvesting level back down to 10 percent.

3.3 Wood harvesting and Modified Timber Stand Improvement

The Kalahan Reserve has at least 5 000 hectares of second growth forests outside of the Sanctuaries. A few of these secondary forests are the forest fallow of the agricultural plots but most of them are considered as production forests.

The wood produced in the fallow can only be used for fuel or fencing because of its small size but the other forests can also produce lumber by using the Modified Timber Stand Improvement technology developed by the staff of the KEF.

Comment: /forest goods

The logging industry has occasionally implemented a TSI system in the past. The loggers remove damaged or deformed trees or trees that are not considered to be "crop trees" by girdling or poisoning them. They also remove vines, which might damage the "crop trees". This is usually done about 5 years after logging in a residual and/or second growth forest to improve the harvest after another 30 years. The KEF considers such practices to be very wasteful and damaging to the forests because they change the very character of the forests into something more resembling a plantation which leaves very little room for the wildlife.

Through the Modified TSI System, the KEF aims to produce a forest and in the process it obtains lumber which is culled from the forest in order to improve it. The process is labour intensive, however, so it is not suited for the lumber industry. It is well suited, however, to the Community Based Forest Management system being promoted by the Philippine Government. The Modified TSI system is most appropriate for forest farmers who are responsible for 5 to 7 hectares each.

Comment: forest operations

In the first stage seriously deformed trees are removed unless the tree in question is the only tree of its species in the area, in which case it is left for a few more years. The same criterion is used for diseased trees in the forest although if the disease is of such a nature that it could endanger the entire forest more radical action is required. The amount of wood to be removed during this stage depends on the quality of the forest, but it is usually about 25 percent of the annual growth rate, or less than one cubic meter of wood per hectare per year[1].

This process is continued on a yearly basis to ensure that the forests, and the individual plants within it, would continue to grow rapidly while still maintaining maximum biodiversity and maximum "health." This should be done with a minimum of disturbance to the total ecosystem.

The forest farmer saws the trees which he fells into boards in the forest leaving all of the branches, tops and sawdust to provide additional nutrients to the remaining flora and fauna. The boards are carried out of the forest by horseback, water buffalo or by hand. The only equipment that the farmer needs is a chainsaw.

The wood removed from the forest during this period is not usually considered to be first class lumber. It is usable, however, and therefore valuable and provides a small income to the forest farmer. By the end of the first stage the forest farmer may be removing up to three cubic meters of wood per hectare per year but the standing wood in the forest is still increasing by at least six cubic meters per hectare per year and probably much more.

The second stage of the Modified TSI programme begins when the forest has reached the "closed canopy" state. Then the problem of sunlight within the forest must be considered. Tropical rain forests are notoriously dark and the lack of sunlight seriously inhibits the growth of young trees within the undergrowth. The forest farmer, therefore, needs to check the forest regularly. The goal at this stage is to re-open the canopy just enough to enable the wildlings to grow. This is done by topping and then felling a mature tree, which is causing shade but is not growing rapidly and is not needed for seed production. When that tree is removed, the young growth near the re-opened canopy will be invigorated.

[1] Data concerning the growth rate of the various types of forests inside the Kalahan Reserve was obtained from the University of the Philippines in Los Banos (UPLB) and compared with data available from the Department of Environment and Natural Resources (DENR). These were also compared, in several cases, with growth rates obtained from a few sample areas within the Kalahan Reserve.

The amount of wood removed during this second stage will usually exceed half of the annual growth rate, probably about five (5) cubic meters, and will produce high quality lumber. Even with this amount of culling, however, the micro-climate of the forest continues to be appropriate for wildlife including microflora and microfauna.

This programme of improving the timber stand should come to a peak in about twenty to twenty-five years and could continue at that level indefinitely. Once it has reached its peak it will be necessary to remove 100 percent of the annual growth rate each year because the forest floor could not carry more biomass. This should produce as much as fifteen cubic meters of wood per hectare per year but the forest will still retain its rich bio-diversity and be an effective watershed.

At present prices for raw lumber, a forest farmer who is utilizing this Modified TSI technology in as little as 5 hectares of mature forest could realize more than 150 000 pesos (Philippine currency) per year from the sale of lumber. This is equivalent to the annual income of many professionals in the country. The forest farmer would still have plenty of time to produce enough food for his family because the Timber Stand Improvement Programme is not full-time.

It is hoped that the lumber obtained in this way from within the Kalahan Reserve may eventually become the basis for a small furniture industry to maximize the value of limited resources and provide expanded employment opportunities for another portion of the population.

3.4 Orchids

Eighty-six species of wild orchids have already been identified in the forests of the Kalahan Reserve. There are undoubtedly others, which have not yet been identified[2]. Merchants from adjacent lowland communities have established profitable businesses by buying wild orchids from Ikalahan gatherers and selling them with a three hundred to five hundred percent increase in price to the metropolitan market.

Comment: forest goods

Although it might be possible to improve the economic situation for the local gatherers by eliminating the middlemen, this was not seriously considered because the supply of wild orchids is limited and could become endangered. The community leaders have already observed that some species are becoming scarce.

The KEF is now training some of its personnel in the technologies necessary for micro-propagation of orchids. The wild orchids will provide the needed genetic materials but will no longer be harvested except to serve as mother plants in the KEF orchidarium.

Comment: socio-ec

The “Community Pots” of tiny orchids produced in the laboratory will be sold at minimal price to the Kalahan Academy and to various interested farmers. The purchasers can then raise the young orchids to marketable size in their “backyard forests.” This activity should provide a supplemental income to the Academy and to the farmers. It should also provide an additional reason for the farmers to protect the forests by making them economically more valuable.

Comment: socio-ec

The young orchids, which will be sold to the Kalahan Academy, will provide the basis for income generation with which to subsidize the extensive educational programmes of the KEF.

The overall effect of the programme will be to further protect the forests and watersheds but it should also provide a good source of livelihood for a significant portion of the population. It is not likely that the market for orchids will decrease in the foreseeable future.

[2] The latest figures indicate that more than 250 species of orchids may be found in the Reserve.

3.5 Spices

Achuete (*Bixa orellana)* was found growing in the Kalahan forests but it was not the best commercial quality. The KEF therefore obtained seeds for an improved variety. The plants are now bearing fruit and achute is regularly being sold profitably to a manufacturer in Metro-Manila who sells packaged spices. The KEF is intending to expand production. Plantings, as usual, are in small plantations scattered within forested areas.

Comment: forest goods & services

Research is still underway to identify other species such as cinnamon and cardamom, which might be valuable and could be developed as products. Wild species of both are indigenous to the Kalahan Reserve.

3.6 Hunting

By the time the Kalahan Reserve was 15 years old, one of the most active hunters of wild meat suggested to a KEF forester that it was not enough to merely have sanctuaries. The Reserve should also have a strictly enforced hunting season. The staff and the hunter brought the suggestion to the next meeting of the Board of Trustees. The suggestion was so contrary to ancient Ikalahan customs that the Board doubted that it could be enforced. Finally they drafted a proposal to limit hunting to two months a year and sent it to all the communities within the Reserve for comment. The fact that a hunter had made the original suggestion helped to convince the communities of its importance but it still took months before all the communities agreed to the suggestion. When all of the communities had approved the proposal the Board made it a policy and the various village governments made it a regulation.

3.7 Other non-wood forest products

Many other possible niches have been tentatively identified but some seem not to be economically valuable at the present time. Those being studied include the production of hand-made paper; essential oils, especially citrus oil; resins, especially pine; dye stuffs; mushrooms, jewellery and many others.

Comment: forest goods & services

Some of these possible niches, which are not now profitable, might become profitable in the future as markets change. One lesson in this regard concerns the marketing of mineral water.

Over a decade ago a staff member suggested that mineral water would be a good product for the KEF to market. There were very few producers of bottled water at that time and the springs in the Kalahan Reserve have very good water. The needed capital investment for filtering equipment could be recovered in a reasonable length of time. The matter was discussed and rejected by the Board of Trustees who said, “Who would want to buy water?” During this past decade, however, the supply of potable water in Metro-Manila has become a severe problem. Many small and large companies have entered the market with both mineral water and distilled water. The market is huge and increasing but so much competition exists at the present time it is deemed unwise for the KEF to try to enter the “rat race.” The opportunity has been lost.

It is not desirable, of course, to encourage the total population to enter a single niche. That, in itself, might be damaging to the balance in the environment. The KEF has learned from the study of ecology that diversity is usually the best policy.

As the population slowly increases, the number of niches will also need to increase. This is limited only by the creativity of the population in cooperation with the tribal leaders and the KEF staff.

4 ASSESSMENT AND CONSERVATION OF BIOLOGICAL DIVERSITY

Now that the population can obtain its needed cash income from the various identified niches described above and its food from a sustainable system of swidden agriculture that is both productive and protective, the pressure has been greatly reduced on both the old growth and second growth forests. The result has been a willingness of the population to institute a strict hunting season for wild birds and animals and other protective measures. The Ikalahan have also expanded the Sanctuaries from 400 hectares to 4 000 hectares.

Comment: concl

Even without research and inventory activities it is easy to observe that the total environment is in good condition. Small fish are abundant in the streams and rivers and children delight in catching them to add variety to the family diet. Butterflies decorate the landscape and birds can be heard in the forests.

It was felt necessary, however, for the KEF to continue to expand its knowledge of its own environment and its own resources. Several research programmes were therefore undertaken simultaneously for that purpose.

4.1 Flora

One of the KEF staff foresters was sent to the National Museum and to UPLB to learn how to make "herbarium sheets" according to acceptable standards and to improve her ability in plant identification. Although herbarium sheets for a few grasses and ferns have been made, the emphasis in this research has been on larger plants.

Each species is identified by scientific name, location within the Reserve, preferred habitat, potential uses, local name, common name and whether or not the species is included in either the CITES or IUCN lists of protected species. All of this data is recorded in a computerized database.

Possible errors are regularly "weeded out" by having the computer alphabetize all of the information according to the various categories. Whenever questionable entries are discovered, the information is sent back to the forester for re-checking. The database is printed out occasionally and copies given to various universities who may also provide their own corrections if found necessary.

It is the goal of the KEF to make at least four herbarium sheets for each species of flora discovered within the Reserve. One complete set will, of course, be kept within the files of the KEF. Other complete sets will be stored in the National Museum, the College of Forestry in Los Banos and in the Nueva Vizcaya State Institute of Technology.

There are presently 1 400 identified species of plants in the database. More than 900 of them are already represented in the herbarium sheet collection. The research is continuing and the number of species is expected to reach 1 800. Eleven of these identified species are on the CITES Appendix 2 list, not including the orchids, and another five are listed in the IUCN Red Book as Endangered. Eighty-six species of orchids are found in the forests of the Kalahan Reserve[2]. Two of these, in Genus *Paphiopedellum*, are on the CITES Appendix 1 list. The remaining 84 are in Appendix 2.

4.2 Fauna

The study of fauna within the Kalahan Reserve is much more difficult than the study of the flora and has not progressed nearly as far. Some of the birds are migratory because the Reserve is on the route for migratory birds from Korea and North China. Research on birds has progressed further than other studies.

4.2.1 Birds

Several methods have been utilized to identify bird species:

Photographic studies and the establishment of a database

On three occasions community leaders and other knowledgeable persons have met with ornithologists and/or biologists to study printed pictures of various known Philippine birds. The local people have identified a large number of the more common birds in this way.

As with the flora records are made of the scientific name, habitat, relative population, food, local names and other pertinent data. This data was then compared with the ICUN lists and with the CITES lists and that information was added to the database.

Brainstorming

During several of the ecology seminars and other community meetings, people were asked to name all of the birds that they could think of. These lists were recorded and compared with the results of the photographic studies. People were shown the pictures of the species that they named and if there were variations, the fact was noted and further studies undertaken. If a previously unidentified species was named, an effort was made to get a description. In some cases and review of the photographic records of Philippine birds was enough to identify the bird. In other cases it was not.

Fieldwork

Biologists, foresters, ornithologists and other researchers have also used mist nets, traps and other methods to capture birds and other fauna, which are released as soon as they are identified.

In a few instances the species are clearly not identified in the reference books and appear to be either new species or new sub-species. In these cases the KEF is beginning to register them as such. These include, among others, one species of Dove, one sub-species of White Eye, one sub-species of Thrush.

To make it easier to handle the data and eliminate errors, the available photographs and paintings were scanned and printed in colour to compile with the information from the database to make a “Bird Book” of all species within the Kalahan Reserve. That book now contains 148 species but approximately 40 other species are still being studied.

Individuals and groups can now study the Bird Book to correct the identification and cultural habits of each species. In this way the compilation of information about birds can be regularly improved.

Of the 148 species, which have been clearly identified, 27 are on the IUCN Appendix 2 list. Three additional species are in Appendix 1 but the community leaders report that two of the three have not been seen for several years so they are not sure whether they still exist in the area or not. Those two are the Philippine Eagle and Koch’s Pitta. The Peregrine Falcon, the third from Appendix 1, is still seen occasionally.

In addition to those species protected by virtue of their inclusion in the CITES lists, the IUCN Red Book classes five of the identified species as Endangered, another six as Vulnerable and three others as Threatened.

4.2.2 Other fauna

The same process will be followed for the other fauna as the staff has time and money to do so.

Although the record of other fauna is very incomplete, 48 species of large fauna have been identified and another 20 are being studied. Included in this number are ten species which are on the CITES lists

in Appendix 2. Eight of the ten are also on the IUCN lists. They include five species of bats, two lizards, one deer and two snakes.

4.2.3 Enhancement of habitats

Five years ago about 25 Ikalahan leaders from all of the communities inside the Reserve, including trustees, village officials and hunters, participated in a three-day workshop to seek a solution to the problem of dwindling populations of wild fauna, especially birds. Based on the list of identified bird species, participants informed the staff of the preferred habitat of each of the endangered species, their preferred food and preferred nesting sites. The participants and staff together then identified the plants, especially trees, which would improve the habitat for those species that were endangered. The KEF foresters took the results of the workshop and immediately began planning how to improve the forest and other habitats by multiplying those species in appropriate areas. It was quickly noted that improving the habitat for endangered species would automatically improve the forest and habitats for other species, including humans. Several species of indigenous trees are now being planted in both the sanctuaries and in the production forest.

Many of the residents within the Kalahan Reserve have now recognized that the biodiversity in the area also makes their agricultural activities more fruitful. Pest damage is minimized by the presence of natural predators. Soil fertility is maximized by natural means without resorting to chemicals. This protection of the total biodiversity also improves the quality of life; physically, psychologically and economically.

5 FINANCIAL AND HUMAN RESOURCES

5.1 Administration and finance

The KEF is administered by a Board of Trustees composed of 13 Ikalahan leaders. Nine communities are recognized within the Kalahan Reserve delineated according to ancient social boundaries, rather than political boundaries. Each community chooses one person to serve as Trustee. Imugan chooses two trustees because of its very high population density. The remaining three members are chosen by the Alumni of the Kalahan Academy, the youth within the Reserve and the village governments within the Reserve. The Board chooses its own officers.

Comment: governance

Although the Board members handle some of the day-to-day work of the KEF, most of it is done by the employees who are organized into teams according to their functions. The faculty of the High School, for instance, is considered to be a team with the Principal acting as the Team Leader. The personnel of the Food Processing Center compose another team. The persons responsible for transportation and all other utilities are united in the Service Team. The Piggery is considered to be another utility for recycling food-processing wastes into fertilizers and so that project is also in the Service Team. Foresters, forest guards, a mapper and orchard caretakers work together in the Agro-forestry Team. The bookkeepers and related office personnel also compose a separate team known as the Office Team. Finally the extension, research and health personnel are combined together into the Research and Extension Team.

The teams are coordinated through an Administrative Team consisting of all the Team Leaders and a few other administrative personnel. This organizational structure, though unusual, parallels the social structures of the society and functions well.

Most of the employees are fairly young. Those who are not Ikalahan belong to other tribal groups. The Board of Trustees, on the other hand, is composed largely of Ikalahan Tribal Elders or older leaders of the society. This is a very positive factor in the effectiveness of the development work. During a period of rapid social change many other communities have been torn apart by the struggle between the Tribal Elders who have learned their skills and earned their leadership positions through experience and the young leaders who obtained their skills in educational institutions. The older group is usually more effective in social skills than the younger but the younger usually have more technical skills than the older. It is the social skills, however, which keep the community members working together. The fact that the older leaders are in control of the Board of Trustees enables them to continue to be firmly involved in the development programmes and to maintain cooperation.

When the KEF was organized, it had no funds. It borrowed P 5 000 (US$350) from one of its members so that it could tell the government that it had a bank account and would be allowed to register as an NGO. The first building for the High School was built with labour and materials donated by the local population. The second building was constructed the same way with the addition of some funds donated by a Manila-based businessman. Two others were later constructed with supplies provided by the Philippine Government.

The Agro-forestry programme began with donated labour until the Ford Foundation provided a small grant which enabled the KEF to finally do serious research and forest improvement.
During the subsequent two decades the KEF has been the recipient of funds from CIDA (Canada), PACAP (Australia), Misereor, (Germany), ICCO (Netherlands), USAID (USA), IDRC (Canada) and several other smaller agencies, local and foreign. A significant portion of these foreign funds were for either research or “seed money” for Income Generating Programmes.

For two years the KEF had a contract with a Philippine government agency to provide vocational education for local youth. The KEF has been continuing the programme without the assistance of the

government funding. At the present time the Kalahan Academy receives some scholarship assistance from the Philippine government for selected students.

Over the years the amount of outside funding has usually amounted to about half of the total budget of the KEF. The balance has come from funds earned from the sale of products or services or from tuition and fees collected from the students in its school. Several times in its 30-year history it had no "outside" funding but even during those times the programmes continued, although on a smaller scale.

By policy, the KEF allows each team to have first options on the disbursement of funds earned by that team. This provides a stronger motivation for each team to be income producing than if all income went into a General Fund.

It is the intention of the KEF to be self-sufficient as soon as possible primarily thanks to the Food Processing Center and the Orchid programme

5.2 Human Resources Development

5.2.1 Formal Education

The Ikalahan also used the KEF to establish their own High School, the Kalahan Academy (KA), in Imugan. Education is not seen, however, as a means for social mobility but rather as providing access to appropriate knowledge and skills with which to better utilize the available resources sustainably. The curriculum includes a significant amount of Ikalahan history and culture to help the students in their search for self-identify.

Although originally designed to serve Ikalahan students, the KA has attracted students from many other mountain tribes. A recent review of its alumni also indicates that most of the mountain villages which have sent students to the Kalahan Academy now have at least one alumnus serving as an elected official in the Local Government Unit. This has had a very positive effect on the environment and economic development as well as on the peace and order in the remote areas.

5.2.2 Staff Education

Soon after the signing of the Memorandum of Agreement and the realization that trained personnel was needed to manage the programmes, the Ikalahan leaders were faced with a very basic question regarding staff. Two options were seen:

1. Hire highly trained persons from outside the society to manage the programmes efficiently and ask them to eventually train their replacements.

2. Hire local persons who have some training or can be trained to do the work with the understanding that there will be some educational mistakes along the way.

After long and sincere discussions, the second option was adopted. There were at least two reasons for the decision. 1) It might be difficult to eventually get rid of an "imported" staff member. A person might not be willing lose his or her own job by properly training the replacement. 2) Social and communication skills might be as critical to the success of a project as technical skills. A person from another society could not be expected to have the needed communication and social skills.

5.2.3 Adult education

The KEF regularly sponsors seminars and workshops for upland farmers. During these programmes, the staff consciously avoids telling people what to do and how to do it. Instead, they help the upland farmers understand how the upland ecosystems function and come to grips with the various ecological cycles, the demands of symbiosis, the implications of the principles of plant succession and other ecological concepts.

The farmers readily recognize the truth of these concepts because of their own experiences. As soon as they have come to grips with them they begin to find ways to utilize them to improve their own relationships with the environment. This was beautifully demonstrated when Omis, one of the Tribal Elders, decided to expedite the fallow in his camote field by planting forest tree seedlings among the camote. When the field was fallowed, the seedlings were already knee high. The fallow field was ready to be cultivated after only seven years instead of the usual 15. This is a very significant improvement.

6 REPLICATIONS AND RECOGNITIONS

Shortly after the beginning of the Kalahan programmes, the Mangyans in Mindoro, the Ikalahan in Eastern Nueva Vizcaya and many other tribal groups in Mindanao and elsewhere, learned of them and filed petitions to get control of their own resources in a similar way. The Bureau of Forest Development (BFD) of the Philippine Government, in the meantime, realized that allowing communities to control the resources motivated the forest dwellers to protect the resources.

After several more Memoranda of Agreement were signed by the BFD, the Government decided to establish a major programme to be known as the Community Forest Stewardship Agreement (CFSA). Most of the participating communities were Indigenous Peoples and all of them looked to the Ikalahan as the model.

The government later reorganized its agencies and the BFD was integrated into the Department of Environment and Natural Resources (DENR). The CFSA programme was expanded into a more comprehensive programme known as the Community Based Forest Management Programme (CBFM). Simultaneous with the CBFM Programme, the Secretaries of the DENR and the Department of Agrarian Reform issued Department Administrative Order # 2 (DAO #2) under which communities of Indigenous Peoples could register their legal claim to their ancestral lands. The instrument that made this possible was called a Certificate of Ancestral Domain Claim (CADC). Finally, in 1998 the congress passed a law recognizing the CADC and allowing it to be considered as a Title held in the name of the Community.

The KEF has continued to be one of the models during this period of bureaucratic name-changing and alphabet juggling. The fact that it successfully improved the welfare of the residents while, at the same time, protected the watershed and other resources, has silenced its opponents.

The KEF has helped to train many of the leaders of CBFM communities in such skills as Basic Bookkeeping, Ecology, Agro-forestry, Resource identification, Food Processing Technologies and various other concepts and skills. The number of cross-site visits by other Indigenous Peoples and even foreign specialists in forest management continues to increase.

Comment: conclusions- way forward

The effectiveness of the Ikalahan Programmes was recognized by the Philippine President Corazon Aquino when she gave them the Likas Yaman Award in 1992. The DENR held a contest in 1997 to determine the Most Environmentally Aware Educational Institution in the nation. The Kalahan Academy was awarded First Prize. The Department of Science and Technology of the Philippine Government has recognized the Kalahan Food Processing Center as an outstanding Processing Center and the Department of Health also gave the Bronze Award to the Kalahan Health Center for excellence in health promotion.

7 FUTURE PLANS

The present programmes of the KEF are the fruit of many years of trial and error and they will continue in the foreseeable future. There are also plans, however, to expand the services of the KEF and to move into a few additional niches in order to improve the income generating capacity of the communities and increase its opportunities to serve. Options include the production and sale of organic vegetables, electro-plating leaves and blossoms for jewellery and the production of mushrooms on a commercial scale.

The Kalahan Academy plans to reach out to other tribes, notably the Bugkalot and Dumagats of the Sierra Madre Mountain Range and the I-wak of central Nueva Vizcaya.

The resources in the Kalahan Reserve are great and their utilization is limited primarily by the need for imagination and creativity.

The KEF will continue to work with the firm belief that when a person or a community handles the environment the way God intended it, he cannot loose. When a person tries to force the environment contrary to its own systems, he cannot win.

Comment: concl-way forward