From the Ground Up: The Water, Agroforestry, Nutrition and Development (WAND) Approach to Water Quality Conservation in Mindanao, the Philippines

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Abstract
The paper presents an approach called WAND or water, agroforestry, nutrition and development which provides a multi-pronged approach towards water quality conservation and poverty alleviation in Mindanao. Our contention is that water quality conservation is directly linked with poverty alleviation. From an initial area of 2 barrios in 2003 the initiative has grown to cover 26 barrios in 3 provinces. The latest inclusion is ecological sanitation that closes the loop between agricultural production and food consumption, prevent contamination of water sources and prevent the spread of diseases. The wand approach is effective and replicable in most rural areas in the Philippines because a) it provides a menu of solutions to various farmers' felt needs and problems rather than proposing single solutions, stakeholder mobilization and linkages is strong and we collaborate and cooperate rather than trying to work alone; b) self-propelling local organizations are established to sustain the process. These grassroots organizations are federated in order to provide a single platform for policy and advocacy works; c) agro-reforestation is advanced as a viable way to improve water sources at the same time providing precious food, fodder, incomes and various resources to farmers. This is deemed important in view of the burgeoning population and lack of land resources.

Keywords: ecological sanitation, sustainable farming, multi-pronged approach

Introduction
The WAND Foundation (formerly LEF, Inc) started as a localized initiative implemented in 2003 in 2 barrios in Mindanao aptly enough with water, agroforestry, nutrition and development (wand) components. In 2004 we won in the World Bank-initiated Philippine Development Marketplace competition and since then, several donors have funded its expansion to cover 26 barrios in 3 provinces in Mindanao in about 4 years time. One inclusion in 2007 is the integration of human excreta management by implementing ecosan and using human waste as fertilizer thereby closing the loop between food production and consumption and lessening disease incidence and groundwater contamination. This won us another award in the recent Philippine Development Marketplace sponsored by the World Bank in April 2008.

The context of our effort is Mindanao, in southern Philippines which is a region suffering from poor infrastructure, high poverty incidence, and violence that have claimed the lives of more than 120,000 in the last three decades. The violence and rebellion are derived from unfulfilled hopes of peace and economic prosperity after the 1986 restoration of democracy. In the project areas before the project started socio-economic exclusion and poverty is prevalent, availability of potable water difficult, most of watershed areas remain denuded, ill-health and general malice characterizes the population. The government is unable to deliver

the much needed services especially in the agricultural sector where it is most needed because of the gargantuan budget deficit, insurmountable foreign debt servicing, corruption and overburdened bureaucracy. The rural areas remain stagnant with very few viable enterprises operating and farmers producing primary crops being subjected to pricing dictated by middlemen. This project is slowly reversing the difficult scenario by the implementation of potable water system, developing sustainable small farms by integrating vegetable gardening, small and large animals and planting fruit and timber trees, forming functional rural associations and improving the position of women in the community. Our overall objective is, "to uplift the socioeconomic situation of resource poor marginal farming families so that they will be able to live more humane and dignified lives and fully participate in the life of the community".

Discussion of project components and methodologies

The project is implementing a multi-pronged approach consisting of the following:

a. Installation of community-managed gravity-fed water system. The water system is series of catchments emanating from the source and connected to the population center by sanitary polyethylene pipes. The water systems are managed by the barrio association.

b. Community education through barefoot extension agents. The agents are trained volunteers from among the members of the community and act as resource person in their community.

c. Community-based nursery and communal tree planting of watersheds and eroded hillsides. The local associations are mobilized to plant and care for their planted area. Most important ASEAN fruit and tree species are raised and planted to enrich and maintain local biodiversity.

d. Promotion of vegetable gardening to combat malnutrition and improve incomes.

e. Large and small animals are released to farmers to improve their farming system and lessen the burden in the field. The small animal is also a ready source of protein and income.

f. Organizing associations to sustain and manage the initiative. Organizing local associations follow a 3-stage iterative process of formation, strengthening and organizational consolidation.

g. Incorporating gender and development in the whole process and nurturing women leaders.

Our outputs so far include the following:

1. Installation of 5 gravity-fed potable water systems in 5 barrios in Misamis Oriental.

2. Establishment of 39 unit ecological sanitation toilets to control contamination of groundwater and waterways and using the processed human excreta as fertilizer for the seedling nurseries.

3. Establishment of 3 central nurseries to produce high-quality seedlings and planting materials. The nurseries are able to produce an average of 20,000 seedlings per year and the planting of 75,000 fruit and timber trees in 200 hectares watershed areas using ASEAN's most important species (Durio zibethenus, Mangifera indica, Lansium domesticum, etc).

5. Promoting agro-reforestation and vegetable gardening among a total of 2,500 beneficiaries. The agro-reforestation integrates cash crops, trees and farm animals in a given area of land.

6. Training and deployment of 175 progressive local farmers as barefoot technicians and extension agents able to train other farmers and share on the material inputs.

7. Organizing and strengthening of 23 local associations and neighborhood groupings able to manage their own activities and sustain the process through participatory planning and implementation and organizing and building the capacity of a farmers' federation.

The success factors of the project include the following:

1. Rather than providing ready made solutions to peoples' felt-needs, the project provided a menu of inputs involving water, farming development, nutrition and health for them to select depending on their needs, capabilities, personal choice, budget and the condition of their farms. I posit that efforts at water quality conservation will not be successful if the approach is singular and not integrated and divorced from the needs of local, resource-poor farmers. One example of this is the massive drive of a government agency for people to plant trees in the watershed areas to help ensure that water sources is protected. The problem is that people do not participate because their need is more on food and cash crop and they do not see any value to planting timber trees such as Gmelina arborea.

2. The participation and collaboration of stakeholders involving local governments, line agencies, business, youth and religious ensure that support is generated at various levels. Our experience shows that there is a need for each of the stakeholder to know fully well their roles and responsibilities before they will participate fully.

3. Eco-sanitation provides ready and cheap fertilizer for farmers at the same time containing the spread of diseases carried by wayward excreta. It also weaned farmers from the dependence on chemical fertilizer and generates much needed savings. However one problem that we are encountering in the promotion of eco-sanitation is local people's natural abhorrence to human excreta.

4. The promotion of ASEAN's most important species such as durian, lanzones and rambutan help ensure that this specie will not be lost forever and instead will help improve biodiversity as well as improve incomes of farmers. In our experience in the field, we found out that they plant trees only if they find that this will provide them with clear source of income in the future.

5. The creation of community farmers' groupings and a federation help ensure localization and sustainability of the practices and integrate it into the cultural fabric of the community. The current practice by local extension agents is to train individual farmers (early adopters) hoping for a multiplier effect. In the case of our project, we focus more on building the capacity of local groups and start intervention from these groups then expand to nearby villages as the groups become more able to manage their own affairs.

Cross-cutting Themes

a. Gender and Social Inclusion
The subject and object of the project are the near-landless and small farmers in the area. The theme is 'development with equity.' The rule of thumb in community organizing is that at least 50% of the leaders in the barrio associations are women.

b. Leadership and Community Empowerment
In 2007 we started in-depth organizational development activities and consolidation of the local associations organized in the area. Toward this end, some of the farmer-leaders felt that it is high time to create an umbrella federation that will govern all the rest of the clusters/association created for ease in communication and management. Thus for this year the "Nakasama Na" or Nagkahiusang Kapunongan sa mga Mag-uuma nga Nagtikad sa West Misamis Oriental (Federation of Small Farmer Tillers in West Misamis Oriental)was born. The federation is composed of 23 clusters/neighborhood associations.

c. Promotion of biodiversity and watershed amelioration to improve the integrity of water sources
Our agroforestry focus is in promoting ASEAN's most important trees such as rambutan (Nephelium lappaceum), mangosteen (Garcinia mangostana), lanzones (Lansium domesticum), santol (Sandoricum koetjape), tamarind (Tamarindus indica), mango (Mangifera indica) and noni (Morinda citrifolia) for their high valued food and medicinal source. Promotion involve production and dissemination of a popular community-based nursery and tree planting manual, tree planting and small-scale wood processing to generate economic value and market out of planted fast-growing trees. The problem we try to solve is in the fact that seedlings are not readily available and farmers have to source seedlings from far places and not so well known quality and origin. Also seed collection for seedling production does not discriminate what type of trees to use and therefore quality suffers much.

The practices that we promote include; a) use of high-quality seeds and planting materials in tree planting resulting to high quality and production of trees with good genetic quality, b) improvement of knowledge in the control of pest and diseases in the nursery resulting to good quality seedlings, c) proper management of the nurseries (regulated lighting, supply of water, etc)., d) proper field planting techniques (spacing, holing, fertilizing, pest and disease control, etc), e) improved knowledge in wood processing resulting to low wastage and high economic value of processed wood, f) increased appreciation of the economics of tree planting and the management of fruit and timber. The following topical areas were covered in the education activities; assisted natural regeneration; timber stand improvement, small-scale plantation management, sloping land techniques, biodiversity management. Small scale wood processing is covered because there is a dearth in knowledge on the proper use of wood especially coming from small-scale plantation resulting to economic losses and wastage of scarce resource.

Currently we are establishing a "living museum" wherein forest and upland resource of mostly Higaonon and Subanen Indigenous People will serve as the main resource and indexing, propagating and marketing seedlings of ASEAN's most important trees in Mindanao. The concept of the living museum is different from the traditional herbarium, enclosed type but will feature not only the forest resource but also their living culture and way of life. A 6-hectare land area is being used for this initiative. We are starting to look at how

we are able to produce and market products from plants for the local market and later on to seek commercial partners from outside. For example banaba (Lagerstroemia speciosa) grows wild in the area and is said to be high in corosolic acid which is a natural plant insulin and useful in lowering blood sugar. Cough remedies coming from plants are already marketed locally with some success. Treatment of intestinal parasites of farm animals using leaves of local plants are also being done.

Project Results

Table 1. Ecological Sanitation and using processed 'ecosan products' as fertilizer.

Province	Ecosan unit implemented per province	No. of people served	Crops grown and fertilized with ecosan products	Estimated average income increase per year per farmer	Estimated savings in liters water per year compared to 'flush-type' toilet (ave. 6 liters/flush x 1 visit/day)
Misamis Oriental	19	1,260	Vegetables, bananas, seedlings, tree farms, corn	34,000 pesos	2,795,400
Lanao del Norte	4	400	Vegetables, tree parks	Un-computed; newly implemented	876,000
Zamboanga del Norte	16	1,700	Vegetables, banana, fruit and timber seedlings, tree farms	22,000 pesos	3,723,000
Total	39	3,360			7,304,400

Note: Our total investment to date for ecosan toilet establishment is Pesos 1,750,000, one ecosan double vault toilet costing around Pesos 35,000.
Additional benefits in promoting ecological sanitation include;

a. Less pollution of groundwater and waterways as a result of no longer flushing human excreta down to septic tanks.
b. Production of compost/organic matter annually estimated at 35 kilograms per ecosan user x 3,360 users = 117,600 kilograms. This compost when used to plants will increase the plants tolerance to water stress and is essential for nutrient utilization.
c. Less spread of diseases as a result of open defecation.

I don't have empirical data yet for letters a and b and this will be subject to further research.

Small water system establishment
The water system in Barrio Gimaylan is impounded using deep well pump and it is operational already since 2006. The system is being managed by a water committee with LEF as the advisor. During this period, the water system broke down 2 times but was immediately repaired and running again with the repairs shouldered out of the monthly user fees collected.

The system is indeed a big boost to the 120 inhabitants in the area who are dependent upon the Gimaylan Creek for their water needs. With the water system, incidence of diarrhea especially among children was drastically reduced because using the water in the Gimaylan creek is shared with the many animals, people and waste upstream. People also do not need any longer to negotiate steep slopes in order to get water from the creek and carry it upwards to their houses.

Three other water systems were established in 2007, one in Dipolog City and another in barrio Pagawan, municipality of Manticao, Misamis Oriental and in Balintad, Manticao, Misamis Oriental. The water system in Dipolog consists of a concrete catch basin and a deep well. Water is impounded using a portable pump. The water system serves 15 families in the area as well as it is the main source of water for the seedling nursery. The water system in Pagawan is gravity-type with water drawn from a natural aquifer. The main source is connected by polyethylene piping and it is serving a total of 200 families. Incidence of diarrhea has been drastically reduced because the local inhabitants no longer get water from rain pools and mud holes. The water system in Balintad is also gravity-type and serves 75 households. A spring source is where the water is taken and stored in a reservoir.

Draft Animal Loan

The draft animal continues to provide the centerpiece asset that the farmer can have. Our draft animal dispersal system tried and tested for over 4 years now from animal procurement, release, care and management and repayment collection/passing-on is one of the most successful program in the country today with most draft animal dispersal program especially that of the government ending-up as failures, with the ingredient of community organizing and empowerment lacking in substance. Aside from the organized communities we continue to provide technical assistance to ensure that the animals are well taken-care of and that pass-on is ensured.

A total of 202 draft animals have been released to 200 beneficiaries adding to the 44 released in 2006-2007 with a total 246 animals in all. Fifteen offspring has been realized already but there were 3 mortalities recorded

Table 2. Result of the draft animal loan component

Aspect	Result	Peso value
No. of animals released	246 large animals released to 244 small farming families	3,567,000
Average income in being able to farm on time and to improve overall farming efficiency	244 farmers x ave. of 12,000 pesos increase per year	2,928,000
Increase in income as a result of being hired in other farms, average of 40 man-animals days per farmer for the entire	Pesos 150 per day x 244 farmers x ave. 15 days per year	549,000
Total economic value		7,044,000

Note: Our investment to date in this component is Pesos 4,500,000

Other un-computed incomes by farmers will include, income realized from offspring, increase in animal marketability as a result of increase in weight and income in farming efficiency as the farmer now is able to cultivate his farm on time and in an efficient manner (compared to when he has no draft animal).

Challenges of the Project

The challenges of the project include the following;

a. Lack of government support and weak barrio government units. Municipal and barangay governments have very little resources to support development interventions in the rural areas. Added to this is the problem with weak planning and corruption.
b. Peace and order problem especially in the interior areas and massive evacuation results to loss of lives and livelihood.
c. People's slow acceptance of human excreta as organic fertilizer especially for home gardens.
d. Very poor soil condition takes so long to nurse back meanwhile people have to use it to grow food. This problem is coupled with the burgeoning population, loss of biodiversity and soil erosion.

Conclusion

Our approach towards water quality conservation, i.e. watershed rehabilitation, protection of upland water sources and ecological sanitation to prevent groundwater contamination maybe different from other approaches and thus highly successful in the sense that;

a) We do not provide single solutions rather we provide a menu within the ambit of water, agro-reforestation (crop-tree-animal integration), nutrition and building self-propelling organizations of which local farmers can chose from. This is far more superior with the realization that felt needs of farmers are varied and that they participate only when they felt that there is something in it for them.

b) We promote ASEAN's most important trees in the protection of the watersheds and water sources and this approach creates a lot of interest among local and international supporters as these trees are neglected but have the potential to improve incomes at the same time improving our watersheds.

c) We work closely with a multitude of stakeholders and not limit only to a few. We realize that more hands and heads are indeed better. Importantly, we work in close coordination with local government units in the areas fully realizing that they have much to share in terms of policy and technical support. Other players in the NGO community sometimes bypass LGU collaboration in order to remain "pure."

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