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Upscaling the Adoption of Ecologically Sound Agriculture in the Philippines

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[Submitted Paper]

Introduction

Farmers abandoned their traditionally diversified farming systems in favor of monocropped systems characterized mainly by large usage of agrochemicals and high yielding varieties. In rice, the national average yields had increased. The key inputs in increasing lowland paddy rice yield were also adopted in the production of other major crops like corn, sugarcane, vegetables including fruit trees, and in a reforestation program better known as Industrial Tree Plantation (ITP). It took more than a decade before farmers began to realize the negative impacts of green revolution. Farmers had noticed the deterioration of their living conditions (further indebtedness, unable to send their children to school, declining stamina). Mostly, through the efforts of non-governmental organizations and organized farmer groups, the criticisms against high external input agriculture were ventilated. Non-governmental organizations started their own trials and experimentation on organic farming or chemical-free agriculture. They started establishing demonstration farms (NGO staff-managed and farmer organization-managed).

Soon, conscience-stricken scientists/faculty members of the academe who were previously trained as reductionist scientists started to listen and study the farmers' complaints. A number of them have tried to validate and study the practical applications of organic farming by some farmers.

With the help of media (both print and broadcast), the popularization of the issues gained full speed and common knowledge. Ecologically sound agriculture became popular with a collective term 'Sustainable Agriculture' (SA). While debates are raging on what acceptable definition of SA is, everybody agrees on the need to reduce agrochemical use. SA became the buzzword. Even the politicians rode on the issue.

The mainstream or formal sector (instruction, research and extension) positively responded. There are at present some programs such as IPM (Integrated Pest Management), promotion of bio-fertilizers (commercialization of compost preparation

and distribution) and training seminars/workshops sponsored by the formal sector. Politicians realized the urgent need to plant trees (but they were not prepared to pass a law on total log ban).

There had been a faddist type and bandwagon-like popularization of SA. From mere advocacy mainly led by Non-Government Organizations (NGOs) and People's Organizations (POs) and very limited number of scientists, SA suddenly became a mainstream agricultural research and development framework.

Ironically, SA's sudden acceptance did not result in its widespread adoption by farmers. There was an absolute increase in the number of farmers who have shifted their farming practices and systems. However, in a village, they are the exceptions. The significant majority are still very much in the green revolution agricultural practices (monocropping, heavy use of chemicals).

Upscaling the adoption of ecologically sound agricultural practices from the domain of exceptionally outstanding farmers or early practitioners to village community level remains to be achieved.

Objectives of the paper

This paper aims to present the situations (ecologically unsound agricultural practices), the measures that were identified to make those identified agricultural practices ecologically sound, identify/test some interventions in response to farmers' inability to implement the identified measures; also, analysis of why a particular intervention seemed to be not working is included and options or remedial measures are being proposed to upscale the adoption of ecologically sound agriculture in the Philippines.

Scope and limits of the paper

The presentation and discussion shall be limited to the lowlands (rainfed, irrigated) and upland environment mostly grown with rice, corn and sugarcane. Uplands are mostly planted sparsely with coconuts.

The data and observations were synthesized from the series of farmers' seminars and workshops in 11 provinces, namely: Nueva Ecija, Tarlac, Camarines Sur, Negros Oriental, Negros Occidental, Mindoro Occidental, Mindoro Oriental, Iloilo, Agusan, Misamis Oriental. (The author served as a resource person/facilitator during the farmers' meetings). The series of farmers' seminars/workshops covered in this paper started in April 1995; the last one was in August 1996. The seminar and workshop were both done on-site (in the farmers' village) and off-site (outside farmers' village – conference hall/training room). The environment under which the seminars were conducted ranged from natural (under the trees) to artificially ventilated to air-conditioned rooms and the food served ranged from natural (vegetables raised by the farmers) to cuisine-type menu.

The seminar/workshop format is shown in Table 1 and lasted from one (activities 1-3) to two days (activities 1-5) and farmers attendance ranged from 15 to 100 persons.

| No. | Nature of Activity | Methodology |
|-----|--|--|
| 1 | Surfacing of issues, concerns, problems | Use of meta-card. Group workshop followed by plenary presentations |
| 2 | Presentation/Discussion of output | Plenary |
| 3 | Lecture input from the resource person | Lecture + discussion |
| 4 | Planning workshop | Group workshop |
| 5 | Presentation/critiquing of workshop output | Plenary |

Table 1: Seminar/Workshop Format

Discussions of findings

Summarized in Table 2 are the lists of ecologically unsound agricultural practices (situation) and the corresponding ecologically sound practice(s) (measures). It is interesting to point out that farmers knew all along what constitute ecologically unsound agricultural practices from the lowlands to upland environment. These are as follows:

- burning of crop/weed residues,
- heavy use of chemicals (fertilizer, pesticides),
- monocropping,
- soil erosive farming practices in the uplands (plowing along the contour/orienting rows along the contour, etc.).

Likewise, it is also revealing to note that farmers are familiar with many of the measures needed to address or solve the ecologically unsound practices and transform them to ecologically sound practices. Nine out of the eighteen measures, or one-half, of the measures (Table 2) emanated from the farmers.

If farmers knew all along the measures, why were they not doing these on their farm? This question can be best answered if the reasons for their inability to do the identified measures are known. Table 3 presents the reasons (farmers identified 20 out of 37) why the identified measures to transform their farming practices from ecologically unsound to ecologically sound practices are not being done or could not be done.

Farmers simply burn crop/weed residues (there are some farmers who incorporate crop residues in their soil). Five of the seven reasons mentioned by the farmers include:

- it is laborious to spread or pile crop residues,
- residues obstruct tillage operations,
- farmer wants to immediately establish new crop,
- hampers the growth of seedlings, and
- residues are intentionally burnt by some people (duck raisers).

On the other hand, farmers are not fully aware of the value of crop residues (monetary, environmental). Hence, they find it easy just to burn them. After discussing with them the value of rice straw/corn stover and asking them if they will still burn these materials, their answer was 'From here on, we will not *burn* our crop residues.'

This answer was among rice farmers. It should be important to point out that rice farmers who raise carabao and cattle in the rainfed areas treasure very much their rice straw and they do not burn them.

It is the farmers in the lowland irrigated areas, who sold their carabaos and opted to use small hand tractors for land preparation (hence, they see no need for preserving rice straw as feed for carabao/cattle), who are quick to burn rice straw. The case in corn is different. Corn stovers are thicker and they take time to decompose. Incorporating corn stover in the field needs a heavy duty tractor (disc harrowing, deep plowing). Farmers generally custom hire a tractor. They economize on land preparation by allowing only two passes of disc harrows. This is minimum tillage and hence, minimum expenses but at the expense of burning the corn stover to achieve satisfactory land preparation for easy corn seed establishment. The long term adverse effects on soil productivity are showing: Fertilizer application rate has more than doubled from 2-4 bags in the 1970's to 6-10 bags in the 1990's. Yet, yields are decreasing. This is not due to fertilizer alone. It is the combined effects of an increasingly difficult production environment (erratic rainfall, heavier rain downpour, drought, strong typhoons).

Farmers' dependence on the use of chemical fertilizer could not be attributed to their lack of knowledge on the value of using animal manure. The reasons why they do not use animal manure are as follows:

- no adequate supply,
- not available when needed,
- bulky,
- gives foul smell, and
- they have no carabao or cattle.

Green manuring is a practice which farmers find most difficult to adopt. They could not appreciate the idea of planting and then plowing under legumes at blooming stage. For more than 10 years, the use of Azolla in lowland paddy fields has been promoted. However, discontinuous irrigation and low soil phosphorous inhibit the sustained growth of Azolla.

It is not that the farmers do not know diversified farming or growing of crops other than corn, rice, or sugarcane. In their backyard, fruit trees, vegetables and some woody perennials (bamboo, acacia, narra, mahogany) are being grown. In their farm, it is essentially monocropping except for a few farmers. Some of the reasons why they do not adopt diversified farming are as follows: *lack of seeds/ seedlings, credit support to rice, corn, sugarcane only, they are habituated to monocropping and some farmers still do not own the lands they till.*

Some farmers have started planting trees. But they are exceptions. Reasons why farmers find difficulties in planting woody perennials include: Space occupied by woody perennials reduces the area for food crop production, presents conflict among farmers as to who owns the perimeter or farm boundaries, farmers are pre-occupied in satisfying their immediate food and cash needs, and some are merely tenants.

Equally difficult to promote is the adoption of soil and water-conserving farming practices in the uplands. Farmers find it difficult to plow, plant and harvest crops

across the contour. For alley cropping, they perceived that the space occupied by the alley crops considerably reduce the space for their food crops, it is laborious to periodically cut the alley crops as green manure. They find difficulties in establishing alleys, and they do not know how to use A-frame.

The reasons provided in not adopting ecologically sound agricultural practices from the farmers' view point are valid. Time is running short as soil erosion is proceeding at an alarming rate (2 cm top-soil lost every year (Table 4). It was estimated that fertilizer application rate increased at 0.2-0.5 bags per ha per year for rice and corn, 0.5-1.0 bag per ha per year for sugarcane (1 bag = 50 kg fertilizer).

The interventions listed in Table 3 to mitigate the reasons for not adopting a particular ecologically sound practice were grouped together and are presented in Table 5. The conduct of farmers' seminar, training and information campaign tops the needed intervention (15 times cited). This conforms to earlier findings results (Table 6). Credit assistance, cooperative, supportive policies had equal footing (6 times). Agrarian reform was least (2 times). This may be found contradictory to reports presented by other workers (Jacinto, 1996; Mendoza, 1992; Patayan, 1990; and, Enriquez, 1990). It should be pointed out that the farmers' seminars were all conducted in selected agrarian reform communities (ARC's). It should be expected that land tenure issues are minimal in these communities.

Issues and concerns about the interventions to upscale the adoption of ecologically sound agricultural practices

The conduct of farmers' seminar and workshops

Participants. It is the standard practice to assess the outcome of the just-ended seminar/workshops. On the positive side, participating farmers are showering seminar facilitators with praises and thanks. They are thankful for the seminar because their knowledge was broadened. They are happy to have learned a lot of information. These are the common statements. But the question remains 'Do they practice what they learned from the seminar?' Some do but the majority remains to fulfil what they promised during the seminar. As one farmer-participant quipped, 'hanggang seminar lang tayo!' (We are only after the seminar!). In one informal discussion, we learned that the officers and selected farmers of one cooperative underwent training on sloping agricultural land technologies (SALT). But none of them practice in their own farm what they learned from the training.

Seminar/Workshop Venue. Costs, attendance, participation, control of time and output are key pointers in deciding where to conduct the seminar. There are two contrasting venues: on-site and off-site. Off-site venue generally results in a larger percentage of attendance, often exceeding the target number of participants. Very good participation among participants is obtained easily. Control of time (except arrival of participants) was very satisfactory and the output expected from the participants were realized quickly. The disadvantage was the high cost involved (10 times more expensive than on-site). On the other hand, holding seminar/workshops on-site was less expensive but control of participants, punctuality and sustained attendance, participation in all activities were difficult to achieve.

In one farmers' seminar/workshop, we initially targeted 35 participants (5 per cluster times seven clusters). But only 26 showed up during the first day and only 15 participated in the presentation of the seminar output the following day. We had to comfort ourselves in saying 'We stand for *quality and not quantity!*'

Critical mass of farmers. In one village where the seminar was held, there are 804 farmers but only 142 are members of the cooperative. Of the 142 coop members, 35 participants were targeted. But only 26 showed up and 15 finished the seminar. This presents the issue of when to reach out to the other farmers. Is there such a thing as a critical mass of farmers to propel the rapid adoption of ecologically sound agricultural practice in a village? There are about 4.5 million farmers in the Philippines dispersed in about 42,000 villages.

Farmer-influencing-fellow farmers. The assumption in the seminar/workshop is that trained farmers will soon influence their neighboring farmers and so on. The rate can proceed exponentially. As it appears, this has not been the case. Many points were raised: Farmers are only after the training, other farmers simply wait for the efforts of their fellow farmers, farmers are not that influential, 'You cannot be a prophet in your own place!' In a way, this is questioning the farmer-to-farmer mode of extension. This methodology may still apply for farmers outside the village but not within the village. The role of farmers within a village is valid to impress that the idea is not alien to them. There are village examples.

Credit assistance

On a purely objective account, present credit assistance to farmers simply promote unecological agricultural practices. Loan package promotes monocropping and heavy use of fertilizer. A case in point is the credit programme designed to grow corn in the uplands. Corn is a sun-loving crop. Hence, farmers are not planting trees. Corn requires tilling the soil to be established. This promotes soil erosion. With soil erosion proceeding at a very high rate, fertilizer application also increases but yields are decreasing. This rendered the farmers unable to pay their loan. If only to get another loan, their previous loan were rolled back, thus doubling their loans. Farmers are into perpetual indebtedness.

But well-meant and intelligent farmers want credit assistance to be modified to truly help their fellow farmers. Credit assistance schemes could be devised to support ecologically sound agriculture practices:

- Credit must be extended on the basis of a prepared Farm Plan and budget. (Training output is the farm plan and budget). Trained farmers should help their fellow farmers to prepare Farm Plan. Some farmers do not attend seminars as they are illiterate;
- Credit should not only be extended to promote monocropping and high external-input agriculture;
- Credit assistance must be employed to promote better and improved crop husbandry practices – adequate land preparation, optimum spacing and time of planting, adequate weeding, etc;

- Credit should be designed to promote low external-input agriculture. Farmers should pursue practical/applicable nutrient cycling programme and ecological pest management practices as part of loan agreement;
- In the uplands, credit for corn production will be extended only if the farmers adopt alley cropping and other soil conservation-oriented farming practices (contour plowing, mulching, integration of woody perennials – fruit trees, nitrogen fixing trees, fuelwood/lumber trees). Hence, credit must not only be extended to corn production.

Farmers' cooperative and community organizations

The most prevalent thinking is that farmers are organized into cooperatives as a conduit of credit (both for GO and NGO Credit programme). Hence, organizing farmers was achieved with relative ease. The flow of credit assistance to farmers was facilitated. For many reasons, repayment rate is despairingly low. Alongside, is the proportional decline in the active participation of coop-members in their cooperative.

An orientational shift in terms of the dominant coop-norms and also on community organizing appear to be necessary. For small scale farmers, cooperativism will never be irrelevant. But cooperatives and the ensuing organizing strategies done by local CO or the NGO-CO worker should be oriented towards the adoption of ecologically sound agricultural practices. The coop management must be prepared to assume an holistic role to adequately address the *production to post-production* aspects and requirements of the agricultural system (Figure 2). The void space left by the landowner as in the conditions obtaining among agrarian reform communities should now be assumed by the coop management. It has been a contentious issue that farmers are unable to pay back their loans for ecological reasons. Following this line of contention, the farmers' cooperative should serve as the dynamic force in promoting ecologically sound agricultural practices to regain the economic viability of farming. Some suggestions are as follows:

- The cooperative can engage in bulk buying of animal manure in nearby farms. Arrangements/negotiations could be made ahead of time among poultry owners/cattle raisers for the bulk purchase of manure. Because of scale, then they could be competitive in terms of price and frequency of collection;
- The cooperative can also facilitate bulk buying of seeds for different crop species to support diversified farming. Current coop initiative on rice seed selection, multiplication and distribution among farmers (members and non-members) is an effort in the right direction. But this should be extended to other crops;
- The cooperative can also promote livestock production. Some of the activities to support coop-members in raising livestock include:
 - Maintenance of hog breeding stocks (sow + boar) to produce weanlings for dispersal to members. Boar can be used for upgrading purposes to minimize inbreeding;

- Coop could initiate feed mixing instead of buying readily mixed feed. This would serve as internal marketing for their own corn. It was estimated that at P6/kg farm gate price of corn, feeding it to hog fatteners provides P3.0/kg value added. Excluding farmers' labour, the gross price for corn becomes P9/kg if directly fed to hogs plus the on-farm production of manure for farmers' use.
- Coop credit scheme should be revised to directly promote/support diversified farming. Instead of single commodity financing, it should lend itself to multi-commodity financing;
- Accordingly, the coop management should anticipate the marketing (or post-harvest) assistance/requirements of multi-commodity farming system. Marketing strategies should be devised to benefit the farmers and the consumers as well (Farmers' Coop to Consumers' Coop Marketing scheme?). Improvement in communication facilities (two-way radio, cell phone, Internet and electronic mail) can pave the way for efficient and timely delivery of market-related information.

Policy support (legislative and executive)

There are a number of policies which are antagonistic, non-supportive, or directly prohibitive to the promotion of ecologically sound agricultural practices. (It is not the intention to list and characterize them here). However, there is much elbow room to 'put the house in order' at the local level due to the local autonomy code.

1. A barangay/municipal ordinance could be enacted prohibiting the following:
 - Burning of crop residues;
 - Dumping/allowing hog manure to flow directly to rivers and streams.

The municipal agricultural officer (MAO) is now directly under the supervision of the town mayor for monitoring and supervision of these ordinances.

2. Barangay/municipal ordinance that will legalize the implementation of Zero Waste Management. Bio-degradable waste can be composted to serve as cheap biofertilizer for farmers.
3. Barangay/municipal ordinance regarding loose animals (dogs, goats, hogs, cattle, carabao). In one village, farmers cannot plant mangoes in their farm because of the practice of open grazing (goats, cattle, carabao) after harvesting rainfed rice.
4. Low enforcement – strict enforcement of animal/plant quarantine laws. Review/revise these laws to attune them to present situations.

Agrarian reform

Certain land tenure security (Jacinto, 1996) is necessary to achieve ecologically sustainable agriculture. On the other hand, land tenure alone does not assure the adoption of ecologically sound agriculture. This is revealed by the many agrarian reform beneficiaries (ARB) all over the Philippines. After receiving their certificate

of land ownership agreement (CLOA), soil fertility restoration and/or soil and water conserving practices remain to be adopted.

To argue therefore, that agrarian reform is a necessary intervention to convince farmers to adopt ecologically sound farming practices does not match the existing realities. But this is not to diminish its importance. It is imperative therefore, to analyze the conceptual framework of agrarian reform implementation in the country.

In equation form, the current agrarian reform program is described as:

$$AR = (LTI + SSD) \times SIBS$$

where:

AR = Agrarian Reform

LTI = Land Tenure Improvement

SSD = Support Service Delivery

SIBS = Social Infrastructure Building and Strengthening

There is much change needed. Ownership change is a requirement (LTI). Providing support service like roads, post harvest facilities (SSD) is necessary. Organizing farmers into cooperative (SIBS) needs no further emphasis. But farmers can not pursue the same monocropping system and high external-input agriculture as the previous landowner. As earlier mentioned, the ecological soundness of agriculture is basic, hence, production systems reform (PSR) is fundamental. The agrarian reform equation should thus be rewritten as:

$$AR = (LTI + SSD) \times SIBS + PSR$$

The missing element (PSR) in the current implementation of agrarian reform is what practically happens in the field. Hence, the realization is to deliberately incorporate PSR into the framework equation of AR. PSR, in fact, is the most difficult battle to win compared with LTI. In the end, agrarian reform becomes merely as:

$$AR = PSR$$

There are still significant LTI issues as core feature of AR. The situation becomes a 'chicken and egg' case. But the suggestion is for the tenants to proceed to PSR to strengthen their 'claim-taking edge' of the lands they till. But such a push should be carefully planned and farmers should be made aware about the risks and benefits (Jacinto, 1996; Patayan, 1990).

Farmers' action

Individually or collectively, farmers remain to be the singular determinant to realize the goal of widespread adoption of ecologically sound agricultural practices. They can find more than a hundred reasons for not diversifying their farms, for burning rice straws/corn stover or sugarcane trash and for not being able to do green manuring. But only *one reason* is necessary so they could adopt ecologically agricultural practices in their farm. From thereon, they will find more reasons for doing it than *not doing*.

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Tables

| SITUATION Ecologically Unsound Practices ¹ | MEASURE Adopt Ecologically Sound Practices |
|---|---|
| Burning of Crop/weed residues | Stop burning crop/weed residues* Incorporate crop/weed residues or pile them in one corner of the fields* |
| Heavy use of Chemicals: <ul style="list-style-type: none"> – FERTILIZER 6-10 bags for rice, corn (4 month crop) 18-24 bags for sugarcane (12 month crop) – HERBICIDES – INSECTICIDES | Use of animal manures (poultry manure, carabao/cattle dung)* Practice green manuring* Practice of crop rotations** Plant nitrogen fixing trees* Adequate and timely Land Preparation Optimum crop row spacing** Proper water management* (i.e. rice) Timely inter-row cultivation* Plants resistant varieties** (i.e. rice, corn) Improve crop husbandry** practices – timing of planting, optimum spacing, balances fertilization, reduce chemical fertilizer and increase the use of organic fertilizer. |
| Widespread use of HYV Seeds | Breed/select varieties for organic agriculture** |
| Mono-cropping | Multiple Cropping (annuals and perennials)* Integrated Crop and Livestock*: <ul style="list-style-type: none"> – Crops (main crop – rice, corn, sugarcane) – Livestock: cattle, Carabao, Hogs, Broiler Integrating woody perennials** for fuel-wood, windbreak, construction materials |
| Soil erosive farming practices in the uplands: <ul style="list-style-type: none"> – plowing along the contour/orienting rows along the contour – burning of crop/weed residues | Adopt soil and water conserving farming practices Plow across the contour line* Practice alley cropping* Plant diverse crops that provide permanent cover** Use crop/weed residues as mulch/control for soil erosion by placing them along the established alley** |

Notes: ¹ The ecologically unsound practices were identified by farmers during the series of farmers seminar/workshop. * Measure suggested by the farmers (9). ** Measures suggested by the lecturer/resource person (9).

Table 2: Summarised lists of ecologically unsound (situation) and ecologically sound (measures) farming practices.

| MEASURE | Reason(s) for not doing the identified Measure | INTERVENTION |
|--|---|--|
| Soil incorporation of crops/weeds residues | Want to clear the land fast to establish new crop* | Use of Heavy Duty Tractor |
| | Crop residues are obstruction to tillage operation (plowing, harrowing)* | Crop residues manually or use disc harrows |
| | Hampers growth of newly transplanted crops/yellowing of seedlings* | Allow 304 weeks lead time for decomposition |
| | Laborious to spread or pile crop residues in one corner of the field* | plow under by using heavy duty tractor |
| | Intentionally burnt by other people* | |
| | In-adequate manpower to spread/pile crop residues. Harvesting is the priority** | Use heavy duty tractor to plow under crop residues |
| | Farmers are not aware of the value (monetary, environmental) of crop residues** | Conduct Farmers' Seminar |

Table 3: Reasons of farmers for not doing the identified measure (Table 2) and the necessary intervention to promote their adoption.

| MEASURE (Cont.) | Reason(s) for not doing the identified Measure (cont.) | INTERVENTION (Cont.) |
|--|---|---|
| Use of Animal Manure | No adequate supply of manure on farm* | Bulk purchase of animal manure (poultry manure) through the farmers' coop. |
| | Manure is 'dirty', gives off foul odour* | Use gloves/masks when applying manure |
| | Very bulky, difficult to apply* Not available on-farm when needed* Does not own carabao nor cattle* | Make arrangement to poultry owners to give local farmers priority in buying their manure |
| Practice Green Manuring (i.e. mungbean, Azolia) | Not the culture of farmers to seed and plow legumes especially at blooming stage. For them, it is a wasteful practice** | Plant multipurpose tree legumes on the farm perimeter/headlands |
| | Not suitable to their farm, no irrigation, low soil phosphorous** | Plant adapted legume |
| Practice Crop Rotation (rice-rice or corn-corn) | Rice Areas: No credit is extended for non-rice crop* Corn Areas: Credit is only extended for corn* | Devise credit scheme for diverse cropping |
| | Not immediately suitable for other crops** | Re-landscape the farm |
| | Risks in planting other crops/no crop insurance or other crops planted outside the program** | Address the post-production requirements of other crops |
| Adequate and timely land preparation. Timely inter-row cultivation | Does not personally own carabao plus tillage implements* | Devise credit so farmers can buy their own carabao Farmers Seminar WUE |
| Proper Water Management | Does not own irrigation pump** | Install supplemental irrigation facilities |
| | Relies on the water distribution schedules of National Irrigation Administration** | Devise credit scheme for shallow tube well pump irrigation |
| Optimum row spacing | Farmers believe that theirs is optimum** | Conduct on-farm trial to demonstrate optimum spacing |
| | High planting density gives high yield* | Explain the concept in a farmers seminar |
| Plant Resistant Varieties | No seeds available on farm* | Involve farmers/co-operative in seed production |
| | Prefer current variety due to high eating quality | Establish seed testing centres in many possible areas Implement participatory breeding |

Table 3: Reasons of farmers for not doing the identified measure (Table 2) and the necessary intervention to promote their adoption.

| MEASURE (Cont.) | Reason(s) for not doing the identified Measure (cont.) | INTERVENTION (Cont.) |
|---|---|---|
| Improve crop husbandry practices: <ul style="list-style-type: none"> – Timing of planting – Adequate land preparation – Ecological pest management | Lack of draft animals** | Credit Assistance |
| | In-adequate information** | Farmers Seminar |
| | Literacy problems** | Literacy Program |
| Adopt diversified farming <ul style="list-style-type: none"> – Multiple cropping – Integrated Crop and Livestock production | Lack of seeds/seedlings* | Support on-farm seed/seedling production |
| | Habitual to mono-cropping** | |
| | Government financial support to food security crop (i.e. rice, corn)** | Establish long term credit for diverse cropping Conduct farmers seminar |
| Planting of woody perennials | Do not own land | Agrarian Reform-Land Tenure Improvement (LTI) |
| | Space occupied by woody perennials reduces the space for food crop production** | Needs information drive – Benefit/Cost Analysis |
| | Perimeter planting needs mutual consent between two farmers** | Form conflict resolution team |
| | Farmers are pre-occupied in satisfying immediate food/cash needs | Needs information drive |
| Adopt Soil and Water Conservation practices: <ul style="list-style-type: none"> – alley cropping – contour plowing – planting of diverse crops – use crop/weed residues as mulch | They are mere 'tenants' – do not own land* | Implement agrarian reform- Land Tenure Improvement (LTI) |
| | Space occupied by the alleys reduce the space for food/crop production. | Devise incentives/credit scheme to promote soil and water conserving farming practices. |
| | Difficult to establish alley* (does not know how to use A-frame). Labour intensive.* | |
| | | Promote co-operation among farmers. Scheduling of activities. Employ 'bayanihan' Co-operation among farmers. Conduct farmers seminar. |

Notes: * Reasons provided by the farmers (20). ** Reasons provided by the resource person/observer (17).

Table 3: Reasons of farmers for not doing the identified measure (Table 2) and the necessary intervention to promote their adoption.

1. Estimator:
 - 100cm top soil has been lost for the last 50 years.
 - 2cm top soil is lost yearly.
 - 2cm top soil 200 tons per ha.
2. Note: It takes about 100 years to form 2cm top soil. Value of top soil = P150/ton.
3. Value of top soil lost per ha = P150/ton x 200ton = P30,000/ha.
4. Soil Erosion and Corn Yield – Value of Soil lost less value of Corn harvest: P30,000 – P11,692,80 = P18,308.00.
5. Total cost of Corn Production
 - cash cost = P 7,425.
 - soil lost cash value = P 30,000.
 - total cost = P 37,425.
 - on site environment cost = 100 tons soil per ton of grain.

Note: \$1 – P26.5

Table 4: Soil Erosion Estimates in relation to Corn Yield at Macaangay, Buhi, Camarines Sur (Mendoza, 1996)

| Nature of Intervention | Times it Occurred |
|--|-------------------|
| Farmers' Seminar, Training, Information Campaign | 15 |
| Credit Assistance | 6 |
| Co-operative/Community Organising | 6 |
| Policy Support | 6 |
| Agrarian Reform (Land Tenure Improvement) | 2 |
| Farmers Immediate Action | 2 |
| Total | 37 |

Table 5: Grouping of interventions and the number of times they occurred

| Mode of Assistance | Times Cited |
|---|-------------|
| Training/education in organic farming technology. | 8 |
| Economic support/capital. | 5 |
| Demonstrations. | 4 |
| Encourage farmers to use organic fertiliser or use compost. | 2 |
| Provide organic fertiliser. | 2 |
| Agrarian reform – land to the tiller. | 2 |
| Do not dictate to the farmer what they are supposed to do. | 1 |
| Do not allow farmers to use chemical fertiliser. | 1 |
| Appropriate support services. | 1 |
| Value orientation. | 1 |
| Food for work. | 1 |
| Moral support. | 1 |
| Support legume crop production. | 1 |
| Laws prohibiting chemical fertiliser and pesticides. | 1 |
| Launch campaign so that farmers will not burn their crop residues, collect animal manure etc. | 1 |
| Facilities for the production of more compost. | 1 |
| Technology to produce high-quality compost. | 1 |
| Programme on animal production. | 1 |
| Encouragement to adopt diversified farming. | 1 |
| Deforestation. | 1 |

Table 6: Assistance needed by the farmers to facilitate the restoration of actual soil fertility