

**Linking Research and Local Governance in Environmental Management: The
Experience in Lantapan, Bukidnon, Philippines**

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ABSTRACT

Due to the devolution of powers to local government units (LGUs), the responsibility of managing the environment in the Philippines is given to these bodies. While the Local Government Code (LGC) is in the process of being amended, to, among others, strengthen the provisions for local environmental management, LGUs have taken some effort to address these issues.

Using the case of Lantapan, Bukidnon (Philippines), this paper describes how research links with efforts to support the local environmental measures. In particular, it espouses the use of market instruments in the efficient management of water resources. A local ordinance is drafted in collaboration with the Sangguniang Bayan member that encourages imposition of water tariffs to all commercial users of the rivers in the study site. In addition, the study will describe the processes and constraints in the LGU's adoption or non-adoption, respectively, of proposed water tariff measures as suggested by research.

Lessons from this exercise will be useful for future efforts to link research and local governance in environmental management.

I. INTRODUCTION

The 1991 Philippine Local Government Code (LGC) devolved services related to environmental management from central to local governments. Current provision of the Code pertaining to environmental concerns, assigns the municipal LGUs to oversee the following: 1) water and soil resource utilization and conservation projects; 2) implementation of community-based forestry projects including the Integrated Social Forestry Program and similar projects; 3) management and control of commercial forests with an area not exceeding fifty (50) square kilometers, and 4) establishment of tree parks, green belts, and similar forest development projects pursuant to national policies and subject to supervision and review of the DENR.

At the provincial level, the following functions are defined in the Code: 1. the enforcement of forestry laws diverted to community-based forestry projects; 2) pollution control law, small-scale mining law, and other laws on the protection of the environment; and 3) mini-hydro electric projects for local purposes. The national government agencies likewise are specifically mandated to consult with the concerned LGUs in their efforts to maintain ecological balance.

Despite these provisions in the LGC, it is observed that the natural environment is in varying state of degradation. For instance, it has been estimated that between 74 and 81 million metric tons of soil are lost annually. Sedimentation has reduced the storage capacity of the country's major reservoirs affecting water supplies for domestic and other purposes. It is also estimated that about 20-30% reduction has occurred in the area irrigated in the dry season over a period of 25 years up to 1998 (PCARRD et al. 1999). The available forestry statistics place the remaining areas of old growth forest at 0.8 million ha., from 17 million hectares in 1934, with residual forests covering an area of 2.9 million hectares (DENR-FMB, 1995). Available information also reveals that 50% of the Philippine rivers are biologically dead, if we apply the standard criteria of dissolved oxygen (DO) and total suspended solids (TSS). With these realities, the impact on the state of the environment of current programs and activities are far from ideal.

The local government units are also mandated to establish a provincial office to address environmental concerns. In some cases, the provincial officers are deployed to the selected towns to promote the programs at the province level. The conflict arises in instances where the concern of the town is not consistent with the provincial programs. Since all environmental degradation takes place at the local level, especially in the towns and municipalities, LGU provisions must be given enough handles and instruments to make these more effective and efficient.

This paper demonstrates how economic instruments maybe used in the efficient utilization of water resources in our study area of Lantapan, Bukidnon. Furthermore, we describe the attempt to bring study results to the local policymakers, for their consideration. A draft ordinance was developed by the Sanggunian Bayan of Lantapan member (who is the Chair of the Environment Committee), in collaboration with

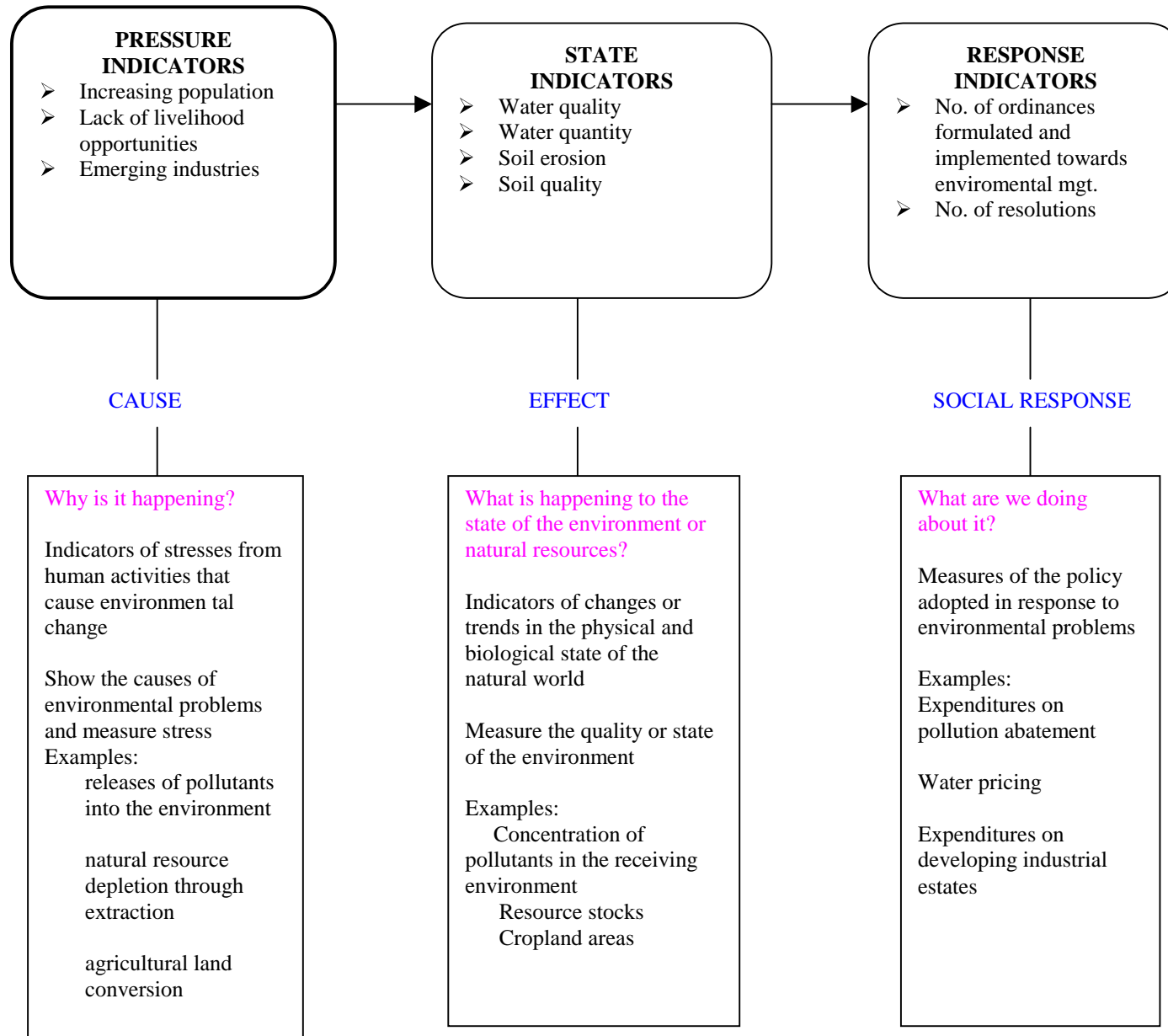
SANREM researchers. To date, this ordinance is still being deliberated in the municipal council.

II. Conceptual Framework

To illustrate how environmental degradation can be abated by local government responses, we used the cause and effect relationship of land use change into the environment as an example. The pressure-state-response framework for environmental indicators (Hammond, et. al., 1995) as shown in Figure 1 is adopted.. The framework shows that the human subsystem in its desire to achieve economic growth and provide the needs of the rapidly increasing populace puts pressure into the environment (pressure indicators). People, in conduct of economic activities converts lands into commercial and industrial uses, and housing facilities, which returns hazardous wastes into the environment and depletes our natural resources. These activities affect the state of our land and water resources and to some extent could lead to death of most of our rivers (state indicators).

What are the LGUs and the society as whole doing about this? Policies are put in place hoping to abate further destruction of our environment. The people then, react either positively or negatively (social response). The effectiveness of course, depends on the implementation, monitoring and evaluation of appropriate policies.

Figure 1. Pressure – state response framework to environmental indicators (adapted from Hammond et al.1995).



III. Methodology

The study was conducted in the Philippine SANREM site of Lantapan, Bukidnon, Philippines. Two sets of interviews were undertaken. One interview schedule was done with the Sanggunian Bayan (SB) members to have a gauge of their level of concern and political will about protecting the environmental resources. Copies of the ordinances that have been formulated and implemented were also secured from the SB (Appendix A). These ordinances were also evaluated in terms of their appropriateness and ease in implementation. Some questions to ask would be whether these ordinances are supported by scientific data; and whether LGUs have enough financial resources for their implementation.

At the household level, seventy three (73) farmer cooperators of the economic study in SANREM were participants of the focus group discussion (FGD). Respondents were asked about the types of ordinances that they are aware of regarding environmental management, who implements these ordinances, are they effective or not, and whether or not the implementation is sustained or if it had any impact at all.

The other topic of interest is the farmers' perception of the impact of the current change in land use in the area. The shift in land use from corn to commercial banana production is anticipated to bring about potential environmental impacts, especially on surface water resources. In the literature, use of market – based instruments, i.e., by charging user fees, are effective measures to abate some of these environmental effects.

To determine the level of user fees that can be charged, a survey of the same 73 respondents was done in May, 2000. Specifically, the survey tried to capture the surface water resources' perceived benefits to the household users. Farmer respondents were grouped into four:

Type A: Those who are users of the river and have rented out their farms to banana firms – 11 respondents

Type B: Those who are not river users but rented out their farms- 2 respondents

Type C: Those who are river users but did not rent out their farms-54 respondents

Type D: Those who neither use the rivers nor rented out their farms-6 respondents

Each respondent was asked to quote an amount he would be willing to accept (WTA) as compensation from the polluters in case the rivers are no longer fit for domestic and animal use.

WTA per hectare was computed as follows:

$$\frac{\text{Average amount (P) /household/year x no. of households affected}}{\text{Total area planted to a crop (e.g. banana)}}$$

From the estimate of the WTA, one can derive for the water tariff that can be charged to polluters as follows:

$$\% \text{ water tariff} = \frac{\text{WTA}}{\text{Net income per hectare}} \times 100$$

This estimate of the water tariff could be a basis for the municipal ordinance to mitigate environmental pollution at the study site.

An attempt was also made to ask the representative of the banana industry on whether they would be willing to pay a certain amount to maintain the safe status of the rivers and assure abundant water supply.

Results of the farmer survey were presented to the members of the Sangguniang Bayan (SB), and the members of Association of Barangay Chairmen (ABC) of Lantapan through a “Kapihan” or seminar at the municipal hall last Aug. 9, 2000. Furthermore, an ordinance (Appendix B) was formulated in collaboration with the SB’s Chairman of the Environmental Committee. The ordinance was presented in a Sangguniang Bayan session held last November 26, 2000. As of April 2001, the ordinance is still being discussed in the SB’s committee meetings and barangay monthly meetings.

IV. Results and Discussion

a. Effectiveness of the LGUs in Implementing Local Ordinances

Human Capability

The most popular ordinances according to respondents include proper waste disposal, banning of cutting of trees (anti-illegal logging law) and tree planting. It is surprising to note however, that only 21% of the respondents are aware that an ordinance on banning the cutting of trees exist. This level of awareness is too low considering the fact that there are a lot of DENR staff monitoring in the area, as it is considered a critical watershed (Table 1).

Study results also revealed that the ordinances are not well communicated and explained to the people. One barangay captain stated that there is no need for additional ordinances because the municipal LGUs have formulated so many of these, but these were not implemented or, if ever implemented, monitoring is lacking.

The barangay officials serve as the major source of information and the implementors of these ordinances as mentioned by more than 59% of the respondents (Table 2). Ordinances and policies are reported and explained to the community during assembly meetings held once a month. Follow-up regarding the status of those

previously announced policies or ordinances was not conducted. Sometimes, the people themselves were absent during the meetings and therefore were not informed.

There is a need to conduct an aggressive communication campaign or social marketing if the LGUs want their policies be made known among stakeholders and intended clients. Through this, the level of awareness of the people will be increased and will make them appreciate the relevance of the ordinances on environmental management.

Forty percent (41%) of the respondents feel that the LGU, i.e. the municipal and barangay officials, were not effective in implementing the above mentioned ordinances. Reasons reported include absence of monitoring and the “ningas cogon” mentality. This means that they are only good and aggressive at the beginning and then the program dies later. It was further noted that there were barangays leaders who were violators of the ordinance themselves and hence, cannot fully convince the community to strictly observe the existing law (Table 3). This reveals there are leaders who merely tell/impose to the people what to do but acts as if he is exempted from the law. Hence the impact of the ordinance is minimal.

In general, however, people treat the barangay officials with high regard. To illustrate this, there were a couple of households in one barangay who were approached by one multinational banana firm in the area. The purpose is for farmers to rent out their land for banana production. The barangay chairman explained that if possible he does not want anybody from the village to rent out farms because he fears that farmers may lose their land to the plantation management. Because of the barangay leaders’ resistance, any of the banana firms now operating in the area are not able to rent any piece of land in this particular barangay.

Absence of monitoring is the major reason for failure of existing ordinances as indicated by 43% of the respondents who mentioned that the LGUs are not effective in the implementation of the laws (Table 4). Others claimed that ordinances do not apply to all and fines are not strictly followed

One can conclude that the LGUs are not effective in implementing policies because they lack the capability to implement laws or ordinances especially when it pertains to environmental protection. Most of the LGU officials are not aggressive when it comes to this type of campaign because the impact of these policies/projects are not tangible or are not seen at once. It takes time before the effects are realized or recognized. Hence, it may also take time before these efforts are converted into votes.

Financial Capability

The LGU officials in the area tend to believe that commercial banana farms should be treated as partners to bring about development. A lot of households benefited from these firms through employment and income from land rent. However, in assessing

the benefits of the banana farms, one should also look at the other unintended effects, such as environmental pollution.

Can the banana firms be partners in protecting the environment? Preservation of denuded resources entails a large amount of money to ensure implementation and sustainability. Currently, the budget for environmental protection is only □ of the 20% of the IRA allocated for the LGU. Part of this budget is used in the formulation of environmental ordinances and public consultations. There is really a need to tap other possible sources, such as water user charges, in order to fast track the sustainable development in this threatened watershed community.

b. Valuation of the Water Resource: Results of the Case Study in Lantapan, Bukidnon

Results of the survey on surface water valuation showed that rivers in the study site are indeed a very important resource (Table 5). The group of respondents who rented out their farms still depends on the rivers for drinking water (72%), for domestic use and livestock production (82%), and for recreation and fishing. Similarly, the group of respondents who did not rent out any land but regard the river as an important source of life, is dependent on the rivers for their domestic water supply (98%) and for recreation (35%).

Realizing the importance and the perceived high value of the river to the majority of the respondents, it became imperative to assess their level of awareness with regards to the causes of water pollution. About 89% of the respondents are highly aware that pesticide use in banana plantation and similar agricultural activities would result to water pollution. Among the farmers' practices, improper application of pesticides, washing of sprayers in the rivers, and improper disposal of empty chemical bottles, are claimed to be the most common causes of water pollution.

It is widely known that misuse of chemical pesticides has contaminated the water resource especially in developing countries. Consequently, it damages the health of producers, workers, and consumers; stimulates the emergence of pests resistant to pesticides; destroys the natural enemies of pests, reduces the fish population rendering them unsafe for human consumption (Pingali and Roger, 1995).

Table 6 shows that 67 or 92% of the interviewed farmers believed that when water becomes contaminated, it will no longer be a safe source of drinking water. Others stated that polluted water would be unsafe even for domestic and animal use and would result to a reduction and/or death of fish and other aquatic life forms. Moreover, 32% of them claimed that contaminated water causes skin disease and irritations.

Willingness to accept compensation

One method to evaluate the cost of water pollution is by asking the respondents their willingness to accept compensation (WTA) to represent the amount that they feel would be needed for the rehabilitation or maintenance of a certain resource into its “pristine” stage, in this case, the Lantapan rivers. The cost of water pollution is expected to increase because of the intensive chemical use especially in banana production.

Type A (those who rented out farms and use the river) and B (those who do not use the river but rented out farms) respondents revealed that they are willing to accept P304.25 and P1,200 per annum, respectively (Table 7). Type B’s higher valuation could be due to their higher level of awareness with regards to water fees, as they pay for water use. (Note: Some households in the area have other water source that has some actual cost, in terms of water delivery.) They could also have forecasted that the present rate will surely increase once the demand for clean water increases. This is anticipated to happen when every household in the community would depend solely on potable water sources.

Type C respondents, (river users but did not rent out land) on the other hand, had a valuation of P5,315.00 per year while Type D (those who are neither users of rivers nor rented out farms) valued it at P4,116.00 per annum. It was observed that absolute values of WTA vary among respondents. Several factors could explain this variation. These include educational background, age, income level, level of awareness as to the importance of water and the water resources.

The demographic characteristics of the respondents are presented in Table 8. Of particular interest is the level of incomes across the four types of respondents. Type C had the lowest reported income per month while Type B had the highest. Thus, it makes sense that the Type B would have a high WTA for the water resource. Type C may have some knowledge of the amount of cost that they have to pay if indeed the river water are not potable. They seem to be the most intensive users of the resource. The WTA quoted by Type D respondents is the one closest to the result of the survey conducted by the local water district, on the monthly willingness to pay of Lantapan households for piped water service. This information was gathered during the Kapihan with the barangay officials in Aug. 2000.

Computation of Water Tariff

Based on the WTA values stated earlier by the respondents (average of Type A and C, as they are the river users) the water tariff that would be paid by the commercial users of water in the locality was computed (Table 9). Results showed that the commercial users may be asked to pay a tariff of P33,681.00 per hectare per year or 26% of their net income per hectare. If the LGUs and the community members would agree and would pursue an ordinance to this effect, then the total water tariff collection for the municipality would amount to P16.8 M per year for the 500 hectares cultivated to banana.

The tariff that would be collected could be used for environmental protection and preservation of endangered resources. The appointment of a municipal environmental officer (MENRO) which is currently not mandatory according to the provisions of the LGC, would be better justified if there are funds to pay his/her salary.

At present, there are some concerned citizens who do volunteer work by acting as guards or watchers over resources. However, such arrangements may not be sustainable. If there are funds to pay hired guards, there will be a higher probability that the environment would be better protected and that the guards will be accountable for resource quality in the locality.

Banana Firms' Response

On the other hand, an attempt was also made to ask the management of the banana enterprises whether they are willing to pay (WTP) for the cost of pollution but results revealed that they would pay only if found or proven to be polluters. Moreover, the one banana firm mentioned that they are adjusting their technologies to minimize chemical dependence. If this is the case, then there will be corporate responsibility; and the severity of the environmental problem could be minimized. What this also implies is that firms would be willing to invest more on environment friendly technologies; the amount of such investment could be equal to their WTP for pollution control.

Linking Research and Local Governance

Based on this research, an ordinance to impose water charges or tariff was drafted in collaboration with the Lantapan SB Chairman of the Environmental Committee (Appendix B). Water charges was deemed necessary so that the municipality will be able to raise funds that could be used for environmental protection. While the study was able to come up with an amount for this charge, the final fee has to be agreed upon by all parties concerned. That is the reason why public consultations are currently under way—first, to assess people's reactions with respect to this economic instrument, and secondly, to agree upon the most feasible amount to be paid. The amount that would be collected represents the degree of the damage that the corporations would cause the environment.

c. Policy Advocacy Activities and Responses of the Local Governments

Since this study was done in close collaboration with Lantapan LGU, we felt that it is very important to advocate the need for policies and policy reform towards environmental resource management.

One activity conducted was the Policy Analysis Workshop held in Malaybalay, Bukidnon in Aug. 2000. The municipality of Lantapan was represented by the mayor and other members of the SB, including the chair of the environment committee. This workshop was also attended by officials from the Provincial Government, lead staff of the Provincial Planning and Development Office (PPDO), PENRO, NAPOCOR, NIA

and DTI. At the end of the workshop, the participants were able to present a policy paper addressing the environmental issues in the province of Bukidnon. Trainings like this, strengthens the capability of the LGUs in identifying specific problems and recommending solutions suited to their particular location.

The LGU officials even suggested that workshops like this should be conducted after the elections so that elected officials will be trained on policy analysis, formulation, and be given directions as to policy prioritization and implementation.

A local “Kapihan” (coffee table discussion) was also conducted in Lantapan, Bukidnon last Aug. 9, 2000, to validate the results of the study. This Kapihan was attended by the Association of Barangay Chairmen and some SB members. The awareness level of the barangay leaders was heightened especially on the potential impacts of the banana technology on their water resources, which at present is still considered healthy. Hearing no objection or contradiction from the participants, the draft ordinance was finalized and scheduled for first reading in the Sangguniang Bayan

This ordinance was already presented for First Reading in one of the SB sessions. Series of committee meetings was also conducted by the Committee on Environment and the group also started with public consultation regarding this ordinance.

Linkage with the Bureau of Local Government Development, one agency under the Department of the Interior and Local Government, in Manila was also initiated. A meeting with the Director was held and researchers were assured that it is possible for research institutions to forward resolutions towards environmental management. This is especially true for concerns that could be incorporated in the proposed amendments to the local government code. A draft policy brief was recently presented that outlined the arguments on the necessity of having a mandatory position for the MENRO.

Another workshop, attended by representatives from government agencies, local government, and non-government offices in Bukidnon, was conducted in February 2001. Implementation of environmental policies was tracked down from the national level to the local level. The participants were instrumental in providing insights as to constraints in the local implementation of the national policies. They also identified the environmentally related problems needing urgent solutions; what is being done at the local level, and the possible solutions. Output from this workshop was presented in the form of a series of policy briefs that could further serve as reference for use by LGUs in initiating ordinances for environmental management.

The activities cited above are attempts to mainstream research results by SANREM to the policy making activities of the LGUs in the study site.

V. Concluding Remarks

Most research results in the past offer recommendations for the policy makers at the national level. As a result, policies being formulated are general in nature and more

often than not are not applicable/ suited to the problems at the local level. This is better known as top-down approach.

In this exercise, we tried to collaborate as much as possible, with the LGUs, other local government offices, and the community members, from the earliest stage until the formulation of the relevant policies necessary to solve the problems of the area. Identification of the specific problem in the locality was very easy with the insights from the local officials who are in touch with the grassroots. Then guided by the knowledge from the trainings on policy analysis, these local officials and representatives from other organizations became instrumental in formulation of local policy alternatives. Finally, solutions were offered/ presented to the clients for verification. Through this process, both the local policy makers and the intended clients agree on the solutions based on their own assessment rather than those of researchers or national policy makers.

As for the status of the draft ordinance in Lantapan, there is still on going public consultation at the barangay level. This is a slow process; but hopefully, this will be positively acted upon soon. This is the first ordinance developed in the municipality that is backed by research data.

Through conduct of workshops, trainings, and public consultations by multi stakeholder groups on critical environmental issues, more and more local government officials, and civil society will appreciate the relevance of formulating measures to manage the environment based on data. Ultimately, drafting of these local measures would have to depend upon science and its empirical results. When this happens, researchers would have indeed done their job.

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Table 1. Awareness of ordinances implemented at the local level by type of ordinance, Lantapan, Bukidnon, 2000.

Ordinance	Aware n = 67		Not aware n = 6	
	No	%	No	%
Garbage disposal				
➤ Prohibiting the throwing of garbage in the rivers	46	68	3	50
➤ Segregation of wastes	16	24	6	100
➤ Provision of pit for garbage disposal	5	7	6	100
Watershed protection				
❑ No cutting of trees	14	21	2	33
❑ Tree planting	7	10	6	100

Note: Multiple responses.

Table 2. Source of information and the agency who implements the ordinances, Lantapan, Bukidnon, 2000.

Source	Frequency	%
Source of information (n = 73)		
<input type="checkbox"/> Barangay officials	43	59
<input type="checkbox"/> SANREM	2	3
<input type="checkbox"/> ICRAF	10	14
<input type="checkbox"/> DENR	7	9
<input type="checkbox"/> No response	11	15
Implementing Body (n=73)		
<input type="checkbox"/> Barangay officials	39	54
<input type="checkbox"/> Barangay health workers	9	12
<input type="checkbox"/> DENR	9	12
<input type="checkbox"/> No response	16	22

Table 3. Respondents' perception on the degree of effectiveness of LGU in implementing the ordinances, Lantapan, Bukidnon, 2000.

Level of Effectiveness (n = 73)	Frequency	%
Very effective	16	22
Moderately effective	3	4
Effective	12	18
Only at the beginning	12	18
Not effective	30	41

Table 4. Reasons for stating that LGU is not effective in the implementation process, Lantapan, Bukidnon, 2000.

REASONS (n = 30)	Frequency	%
No monitoring	13	43
Ordinance does not apply to all	3	10
Not informed	4	13
Fines not strictly followed	1	3
Implementors are also the violators	1	3
Others	8	18

Table 5. Perceived uses of the river by type of respondents, Lantapan, Bukidnon, 2000.

Uses	Type A *(n = 11)		Type C *(n = 54)	
	No. of Responses	%	No. of Responses	%
Drinking	8	72	11	20
Domestic use/ Livestock production	9	82	53	98
Irrigation			7	13
Fishing	7	64	7	13
Recreation / Picnic place	9	82	19	35

Note: Multiple responses.

* Type A: those who use the river and rented out their farms; Type C: those who use the rivers, but did not rent out their farms.

Table 6. Respondents' perception on the consequences of pesticide runoff from banana farms to the rivers in Lantapan, Bukidnon, 2000.

CONSEQUENCES	No. of Responses (n = 73)	%
Water becomes unsafe to drink	67	92
Water no longer suited for other domestic uses	69	94
Reduction and/or death of fish and other aquatic life forms	59	81
Sickness/skin disease	24	33

Note: Multiple responses.

Table 7. Valuation of clean water by different respondents using the willingness to accept (WTA) compensation, Lantapan, Bukidnon, 2000.

Respondents	Willingness to Accept Compensation (WTA)	
	P/mo	P/year
Type A (river user and rented out farm)	25.35	304.24
Type B (not user but rented out farm)	100.00	1,200.00
Type C (river user but did not rent out)	442.89	5,315.00
Type D (not user and did not rent out)	342.83	4,116.00

Table 8. Demographic characteristics of farmer-respondents, by type, Lantapan, Bukidnon, 2000.

Characteristics	Type A n = 11	Type B n = 2	Type C n = 54	Type D n = 6
Household size	9	6	6	4
Age	40	48	43	4
Sex				
Male	8	1	28	4
Female	3	1	26	2
Education	8	10	7	7
Income/month	2,741	4,200	1,680	1,932
Years in farming	27	15	22	-

Table 9. Computation of Water Tariff, 2000.

	WTA (PhP)
WTA/ household/year(average for Type A and C)	2,809
Water Tariff/ha	33,681
Expected Revenue from banana per ha. Per year*	128,280
% tariff	26

*Estimate from Tabien, 2000.

Note: We assume that the number of affected households is: Type A: 1,010 HH; Type C = 4,984 HH

Ordinances on environment in Lantapan, Bukidnon, Philippines

Towards Environmental Protection

1. Resolution Urging all Barangays to Identify and Develop Land Fill

Selection of an area for landfill is necessary and timely to increase awareness of the populace about proper waste disposal. However, a thorough study and consultation with authorities knowledgeable on the proper location and management should be done before assigning a dumpsite to avoid environment related problems in the future.

There is difficulty in the area identification of areas for land fills in the Philippines at this time due to the Payatas tragedy that happened last July, 2000, in Quezon City. In that said disaster, scores of residents near the Payatas land fill were buried alive due to a landslide. Since this was a national news; barangay heads know about this. There is now great hesitation to boost such facility in any particular barangay. There are no economic incentives being drawn as well.

2 A Resolution Declaring Moratorium to the Entry of Other Investors or Company to Invest Projects in this Municipality until such time the Zoning Ordinance would be Finally Approved and Adopted

It is imperative that the areas for commercial, residential, industrial and agricultural sites be properly identified to come up with a well organized location of projects and have an environmentally sound atmosphere.

So, there is a mandate, but inadequate provisions. Resources could be inadequate and monitoring and evaluation framework is absent. There are statements of policies, but cannot be seen on the ground in Bukidnon. In general, implementation could be strong only in some areas.

On Watershed Management

1. An Ordinance Imposing Fines/Penalties for Acts which Endanger the Environment such as the Conduct of Illegal Logging/Cutting within the Municipality of Lantapan, Bukidnon in Support to Illegal Logging Law of the Philippines. Anybody caught cutting, gathering, collecting, removing, or possessing timber or other forest products without license or any legal document shall be fined based on Section 68 of the illegal logging law and shall be punished under Art. 305, 309, and 310 of the revised penal code.
2. An Ordinance Mandating the Strict Observance of P.D. 825 the “Anti-Littering Act and Adoption of Zero Waste Management”

This ordinance provides penalties of up to P200 plus one month imprisonment if found littering in public places such as roads, canals and parks. Each barangay was required to designate a “Bantay Bayan” who will act as point persons or sanitary officers as well as monitor the adoption of this ordinance. Business establishments were likewise required to install garbage cans properly labeled for segregation while all households were mandated to observe and adopt zero waste management by keeping their surroundings clean and clear from breeding stations of mosquitoes, flies, rats, and other scavengers. An Ordinance Prohibiting the Disposal of Garbage, Farm Waste Materials and Dead Animals in all rivers and to its bank within the Municipality of Lantapan, Bukidnon.

Another ordinance in effect is that which prohibits dispose household and farm wastes in all rivers in Lantapan and its banks. Any person violating will be penalized by up to P 2,000

and imprisonment of 15 days and will be required to clean all the wastes thrown into the river. The corresponding barangay who can apprehend the violator shall be entitled to a 50% share of the fine.

The problem with these two ordinances is that there is no identified landfill although some households do the composting. Moreover, there is no provision for the disposal of the non-biodegradables.

3. *An Ordinance Regulating and/or Limiting the Number of Hogs, Livestock and Poultry Raised in Backyards or Residential Areas.* Backyard animals are limited to 3 heads (cows and/or hogs) and 15 heads (chicken) per household. The minimum number was decided upon through public consultation but there is no economic nor environmental rationale for the optimum size/number.

Further, the ordinance requires animal enclosures and sanitary waste disposal system with concrete septic tanks which is smell free and water abundant. It seems to be such a sophisticated housing facility for a very few livestock in a rural environment such as Lantapan.

4. *An Ordinance Prohibiting Stray Animals within the Watershed.* A fine of P2,500 is charged to anyone who violates this law. This is the maximum amount specified in the Local Government Code. Goats go to the grazing lands for feeds but are they stray animals? Or, perhaps in the context of Lantapan, this ordinance is meant to protect the banana plantations. This ordinance also mean that the farmers have to “cut and carry” the feeds for the cattle and carabaos though, we find some serious ramifications about this ordinance. In rural Philippines, animals pasture in any area where grasses and other feeds are present. But because this ordinance does not specify the boundary of the “watershed area” , confusion in its implementation is quite normal. Also one needs to define the boundaries of “watershed area”.
5. *An Ordinance Requiring All Farm Tillers To Adopt Contour Farming On All Sloping Areas* This requires all farmers and farm land tillers to adopt contour farming on all sloping areas. Technicians of the Department of Agriculture currently conduct trainings/seminars on this aspect. Those who fail to adopt will not be able to avail of the government programs and privileges . There is really a need to train the farmers on the proper method and have them appreciate the importance of the technology. However, incentives to adopt proper contour farming are not very attractive up to this time.

An ordinance to impose water tariff to all commercial users of the rivers within the territorial jurisdiction in Lantapan (A Draft Proposal)

Section 1: Definition:

1. Commercial user – any business entity who will necessarily draw water from the rivers within the municipality of Lantapan as a major input to its production, e.g., plantation farms
2. Water tariff – amount to be collected from the direct and indirect users of water intended to maintain or preserve the natural water resource of Lantapan

Section 2: Administrative Provision

Plantation farms shall pay the amount equivalent to 26% (tentative) of their net proceeds to the municipal treasury which will be used exclusively for the protection of the environment.

A. Section 3: Penalty clause

- a) Any plantation farm who fails to pay on time will be penalized by an additional 10% of the outstanding balance
- b) Those who still fail to pay the tariff within 2 years will mean total termination of the project

B. Section 4: Effectivity

This ordinance shall take effect immediately upon its approval

C. Justification

An abundant supply of clean water is vital to high quality of life. River, springs, lakes, and ground water are crucial to public health, economic development, sustainable agriculture and recreational opportunities.

A study conducted by Deutch (1996) revealed that bacterial count in Maagnao, Alanib and Kulasihan rivers exceeds the safety standard by 10-50 times that of US standards. The drinking water supply that is gravity fed through plastic piping systems from the mountain springs had been contaminated with E. coli. Since then policy was never implemented to prevent further deterioration of the water quality and quantity.

Moreover, potential environmental impacts were also identified in the study conducted by Tabien ((2000) as the farmers opted for the banana production.

On Site Impacts

Reduced protective cover of the watershed due to cutting of trees. These will lead to increased surface run-off, reduced soil infiltration, percolation, and water storage. Prevalence of surface run-off leads to increased soil erosion, to siltation of rivers and increased sedimentation. Reduced infiltration and percolation reduces stored water necessary to replenish water in springs and rivers.

Reduced water quantity. The banana plantation requires large volume of water for irrigation, fertilization and pesticide application, all of which will be drawn from the nearby rivers especially the Maagnao River. This increase in water demand puts a strain in the limited supply. Water shortage will be experienced because of over-extraction, that is, extraction beyond sustainable yield. Conflicts on water use among the residents and the commercial users may also arise. The water consumption for banana production is considerably high. The quantity of water that would have been available for households' domestic use, for irrigation of other crops such as rice (downstream area) and vegetables, or for power generation will be reduced.

Reduced water quality. Application of fertilizers and pesticides produce residues that will go with the waterflow and contaminate the water bodies. From the soil, pesticide residues and nitrates will go to the river either through surface run-off or through underground seepage. Rain will carry the pesticide residues and nitrates released directly to the river together with eroded soil. On the other hand, pesticide residues and nitrates in deeper soil horizons will be released slowly to the river through leaching and seepage of water beneath the soil.

Nitrates leads to eutrophication of rivers. It induces the decomposition process of organic material in the rivers that causes reduced biological oxygen demand (BOD). Reduced oxygen in the rivers will lead to death of fish, crustaceans and other aquatic life forms. Likewise, nitrates make the water unsafe for drinking (both for human beings and animals) and for domestic use. Moreover, pesticide residues in air and water poses detrimental health hazards and poisoning.

Reduced aesthetic value of river. Aside from direct benefits, Lantapan rivers were also used for swimming, fishing, picnic and other recreational activities. Once the rivers become polluted, its value for recreational activities will be diminished or if not remedied will be totally lost.

Off site Impact

As source of hydroelectric power. The rivers of Lantapan discharge water to a larger water (Manupali River) which is a critical watershed. The Manupali River supplies water for hydroelectric dams. These dams in turn are also at risk due to wastes and residues that flows downstream which will affect the effective lifespan of the turbines of the electric power plants by at least 10% per annum. This means that if the normal life of the turbine is 30 years, the presence of siltation will make the turbine last only for 27 years at the most, even if a maintenance program is undertaken (personal communication, Engr. Victor

Rodulfo, CEAT, UPLB. Silt that accumulates in the dam will reduce the volume of water and will reduce the capacity of the dam to produce electric power . This will then lead to decreased serviceable area by the NPC.

Destruction of the biodiversity of the rivers downstream. The Lantapan rivers are tributaries of the Manupali River which in turn discharges water to a bigger rivers, the Pulangi River and the Rio Grande of Mindanao. Chemical pollution of these rivers will therefore, destroy the flora and fauna of the downstream rivers.

Hence, there is an urgent need for the approval and implementation of this ordinance to preserve if not, improve the current status of rivers and other water source.

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