THE REQUIREMENTS FOR THE INSTITUTION OF A USER FEE SYSTEM IN A WATERSHED CONTEXT

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LIST OF ACRONYMS

CAC	-	Command-and-Control
CIS	-	Communal Irrigation Systems
EI	-	Economic Instruments
EUF	-	Environmental User Fee
MBI	-	Market-Based Instruments
NIS	-	National Irrigation System
NWRB	-	National Water Resources Board

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INTRODUCTION

This paper discusses the conceptual basis of instituting a user fee policy and its application to watershed management. As economic instruments for natural resource and environmental management, user fees have historically enabled governments to obtain a share of the rents from commercial natural resource extraction as well as control air and water pollution. Despite their limited application to issues facing the green and brown sectors, past policies could provide ideas on how to implement a user fee policy in the different context of watersheds. Adapted to such a context, the lessons culled would help the country improve the watershed's capacity to provide critical resources and environmental services and ensure their sustainability.

The application of a user fee policy to watershed management, however, requires an appreciation of the policy's peculiar functions, the nature and quality of multiple resources and environmental services, as well as the problems and relationships of the various stakeholders in a given area. An understanding of these factors gives better perspective not only of the particular challenges and constraints associated with policy implementation but also of the specific requirements that must be put in place.

To concretize the watershed conditions in which a user fee policy might be applied and the particular environmental and social problems it must address, the paper also provides a cursory and preliminary discussion of the water resource situation in Nueva Vizcaya and North Cotabato. Not only does it identify the particular realities and problems of the two provinces, it also outlines the general courses of action in the implementation of a user fee policy.

The paper is divided into three parts:

- The conceptual framework of a user fee policy as an economic instrument for environmental management in general, and for watershed development and protection, in particular;

- The concrete environmental conditions of the watersheds in Nueva Vizcaya and Kidapawan, North Cotabato that may require the implementation of a user fee system, specifically the current use of raw water for domestic consumption and irrigation;

- The necessary conditions or critical steps in the development, introduction and implementation of an appropriate user fee system in the two provinces.

1.0 CONCEPTUAL FRAMEWORK

1.1 THE USER FEE IN THE GREEN AND BROWN SECTOR

Economic instruments consist of policy tools in the form of input or user fees, charges or taxes, tradable or marketable permits, and subsidies for environmentally friendly activities. Historically, these tools have been implemented in the natural resource (green) or urban (air-water) environment (brown) sector within or outside watersheds. Specifically, user fees or resource charges have been applied to the extraction of particular natural resources, such as forest products and water resources. Economic instruments have also taken the form of pollution fees, emission or effluent charges in the control of pollution or the use of particular environmental media (air, land, water) as a sink or waste dumps.

In different countries, the State, through an environmental management agency, has played a primary role in the introduction and enforcement of economic instruments, including a user fee system. The agencies usually perform multiple functions. They establish standards or allowable levels of economic activity, emissions, or effluents; organize accompanying monitoring and reporting systems to determine levels of activity and detect violations of standards; and levy after investigation the corresponding fees on activities and penalties for violations. The State through such agencies also institutes an adjudication or conflict resolution process to address appeals, command compliance and settle differences between the implementing state agency and the regulated community. The object of the State's environmental management system is thus to regulate the use of particular natural resources and address the problems of air, water and land pollution.

In the Philippines forestry sector, a user fee in the form of a forest charge is imposed on the allowable level of extraction while a penalty, such as the silvicultural fee (that is set 4 times the forest charge rate), is levied on logging damages of residuals that exceed the allowable volume. Similarly, pollution charges are imposed on current detected levels of emissions, effluents, discharges, or wastes that exceed the allowable standard. Operationally, these unallowable levels represent what economic theory would call the negative externalities of economic activities or the sources of damage to the environment or human health. In economic parlance, therefore, the purpose of a user fee is to address current negative externalities above the allowable standard, as well as deter future occurrences.

Whether as user fees or resource charges, economic instruments (EIs) have been implemented as part of the state's regulatory-enforcement structure for environmental management or its command-and-control (CAC) regime. With the evolution of the implementation of these instruments in time, they eventually came to be known as market-based instruments (MBIs) that are distinct from the penalties of a pure CAC regime. The emergence of MBIs, however, did not entail the dismantling of the CAC structure. Instead, together with other MBIs, user fees continue to use the environmental standards set by traditional CAC regulations, and build on the already-existing system of permits (for economic activity or waste disposal), reporting and monitoring practices, the treatment or assessment of violations, systems of fines and penalties, and mechanisms for adjudication and conflict resolution.

1.2 OTHER FEATURES/ASPECTS OF THE RELATIONSHIP OF THE STATE AND THE REGULATED COMMUNITY

As regulator, the state's environment agency has related to the regulated community not only as a vigilant law enforcer. It has not simply dealt with its members as potential culprits, criminals or violators, but more importantly also as potential ally in the promotion of a better environment. As a consequence, the state's environment agency has not only maintained a

regulatory structure to detect and penalize disallowed externalities but has designed economic instruments and incentives for the promotion of more positive economic behavior as well. Against this backdrop, a user fee policy has had the additional objective of changing the production and consumption behavior of the regulated community.

How the state environment agency seeks to change the behavior of polluters depends on the approach to the implementation of a user fee policy and the mode of fee revenue allocation. In this regard, there are three ways to implement a user fee policy.

One is as a financial incentive that implicitly rewards those who pollute less while imposing costs on those who pollute more (Anderson 2002). Set at a base fee for each pollutant, fee payments may vary with the level of concentration of the pollutant. As the level exceeds the standard for a particular pollutant, the fee is applied with greater pollution resulting in larger fee payments. As polluters pay more fees, revenues increase for the state.

A second way of implementing a user fee policy is to set it with the goal of capturing the unaccounted costs to the environment and human health. With this objective, policy formulation would require particular data to measure the extent of potential damage or harm, such as the volume and toxicity of the pollutant, the type and size of the user, the characteristics of the receiving environment, the heat load, and the potential health threat to the receiving community, among others. Based on the measured damages polluters have inflicted on the environment, the user fee serves as a means to partly, if not fully cover the negative externality. Like the first mode of implementation, the second approach could generate revenues for the state, especially if the damage is significant. The efficiency of the user fee system for environmental management, however, would depend on how government will use these revenues.

The third approach to user fee implementation is to set it on the basis of the cost of abatement programs and technologies that polluters can put in place. If the abatement program or technology is less costly than the fee payments to government for damages or pollution, then the regulated business entity undertakes abatement investment that is beneficial for itself and the rest of society. With the use of abatement cost surveys, the state can therefore set the optimum fee that would induce producers to invest in a more appropriate technology. Unlike the first two approaches, the third approach does not generate state revenues. Instead of paying the fees, the potential polluter invests on an abatement technology.

The efficiency of the first and second approaches depends on the utilization of the collected funds. User fee payments provide revenue that may be used either for general government expenditures, or earmarked for agency operations, such as the costs of giving government permits, monitoring compliance, and enforcing programs. If they are set aside for environmental management, the fee would consist of a fixed amount to cover administrative costs and a variable portion that may be used as seed money for an environmental fund. Disbursed as grants, “soft” loans, interest rate subsidies, loan guarantees, or equity investments (Speck 2001), the collected user fee revenues are used more efficiently if they are allocated for priority remedial environmental actions or as subsidies for environmental infrastructures.

Klarer (1999) argues that the success of economic instruments particularly user fees depends on whether collected funds stay in the environmental sector or not. If they do, then “environmental funds, as long as their revenue base is income from environmental charges, taxes and fines, recycle revenues from polluters in general to the polluters responsible for activities requiring remedial action on a priority basis. In this way, in fact the combined charges/ subsidies system may retain the efficient property of an economic instrument.” In other words, a user fee policy for the establishment of an environmental fund is both an efficiency measure and a redistribution mechanism for priority environmental remediation projects.

1.3 PURPOSE OF THE USER FEE IN THE WATERSHED CONTEXT

How will a user fee figure in the watershed context? A watershed performs many economic and environmental functions. Appendix 1 provides a list of the various functions of the natural environment (production, carrier, regulatory, and information), the different watershed resources, the different activities supported on the land, and the types of knowledge that may be drawn from the watershed (de Groot 1994).

Apart from the production of water, food, raw materials, and other resources, the watershed also performs a number of carrier and regulation functions that are enumerated in Figure 1. Under undisturbed or stable conditions, the watershed essentially performs benign regulation functions that provide beneficial forms of environmental services, including the determination of local climate conditions; prevention of runoffs or floods; the maintenance of dry season flows and flood controls; control of soil erosion and sedimentation; maintenance of water quality (control of sediment load, nutrient load e.g. phosphorous and nitrogen, chemical load, and salinity); topsoil formation and soil fertility maintenance; groundwater recharge and the regulation of the water table (e.g. reduction of salinity); and the maintenance of aquatic habitats, such as keeping the water temperature low by shading rivers and streams. Because these environmental services are free, the uncompensated benefits derived from them constitute Nature's positive externalities.

Figure 1 suggests that the carrier functions of the watershed are critical to the provision of environmental services. The pattern of land use or its allocation for nature protection, settlement, agriculture, recreation, and other uses could determine the quality of environmental services provided. In other words, the form in which the carrier functions of the watershed are carried out may either disrupt or sustain the watershed's regulation functions. In turn, the operation of its regulation functions determines the availability and quality of the water resource.

When watershed conditions deteriorate, however, the natural benign services they render become scarce and particular regulation functions cease to operate fully. For instance, a degraded watershed results in a less congenial local climate, flood damages, excess sediment production, reduced groundwater recharge, soil nutrient and other resources losses. Economic damages or losses are, in turn, the consequences of diminished or lost environmental services. The continued economic use of a degraded, unstable environment without mitigating measures exacerbate the situation, further diminishing the environmental services and bringing more negative externalities.

Figure 1. Water Production and Other Related Functions of a Watershed

Production Functions	Carrier Functions	Regulation Functions
WATER	Space for human habitation, settlement	Local and global climate
	Cultivation, animal husbandry, aquaculture	Prevention of runoffs and floods
	Energy conversion	Water catchment and groundwater recharge
	Recreation and eco-tourism	Control of soil erosion and sedimentation
	Nature protection	Topsoil formation and soil fertility maintenance

The application of an environmental user fee (EUF) policy for watershed services has at least three different objectives corresponding to particular modes of implementing user fees. First, the EUF is a means to discourage or penalize present and future activities that bring about negative externalities. Second, it is an expression of the positive value of benign regulation functions or the

free beneficial services of the watershed. The payments made by watershed service users in effect become the compensations for the use of the beneficial environmental services. Third, the EUF generates the resources that may be provided as incentives to those who undertake activities that enhance positive externalities. The resources may also be pooled and set aside as an environmental fund to finance the protection of the watershed and reparation of damages. Moreover, the environmental fund may be also used for the restoration and improvement of the watershed's capacity to provide services.

1.4 CONSTRAINTS OR REQUIREMENTS FOR THE IMPLEMENTATION OF A USER FEE POLICY

A number of conditions constrain or prevent the valuation, compensation, restoration and sustainability of the beneficial services of the watershed. The enunciation of a user fee policy requires addressing these constraints. Specifically, the following imperatives are entailed before the policy can be implemented.

- First, because the regulation functions of a watershed involve complex physical processes, the tangible outcomes of environmental services must be identified and valued. Such outcomes are either inputs or necessary conditions for economic production.

- Second, valuation methods are necessary to determine the value of environmental services since they are not directly observable and there is no market to signal such values. Watershed services may be valued in terms of their future loss or the cost of damages due to their unavailability or degraded state.

- Third, given the absence of a market or an immediate identifiable producer or supplier that would ensure an adequate supply of particular environmental services, the supply side of the market can only be initially formed when potential suppliers are identified and have expressed willingness to become service providers.

- Fourth, it is necessary to address on the demand side the free-rider problem or the absence among environmental service users of willingness to pay. Because many environmental services are not subsumed under any property rights system that would require legal payments for their use, and the culture has not emphasized the maintenance of public goods for everyone, they are generally perceived as freely accessible. As such, non-excludability and non-rivalry are inherent problems. Non-excludability means that consumers cannot be prevented from enjoying a good or service even if they do not pay for its use while non-rivalry means that the consumption and payment of a good or service by one individual does not reduce the amount available to others. In other words, as long as the conditions of non-excludability and non-rivalry hold, there would be no incentive for individual consumers of services to pay for the benefits unless they formally agree as a group of beneficiaries to pay for the environmental services they use. In the absence of a market, the forging of this agreement is a critical task for a third party.

- Fifth, because of the free-rider problem and the absence of property rights, there are no incentives for potential suppliers of environmental services to invest in ensuring the supply. Without such investments, the facility that provides the service or the service itself depreciates. Thus, it is necessary for the disincentive and the under-investment problem to be addressed. Either property rights over the resources necessary for production are given to the potential suppliers of environmental services or a formal agreement that the services they provide would be compensated is required. Formalizing the agreement between the consumers and the providers of environmental services entails a third party

mediator that would specify the cost (user fee) of such services and the rights and duties of each party.

- Sixth, the required activities to guarantee the provision of environmental services or the so-called positive externalities must be specified, as well as the activities that generate the negative externalities or cause damages to the watershed's regulation functions. These activities are akin to the CAC "standards" used to monitor the behavior and compliance of service providers and users. If upland or upstream providers, for instance, meet or exceed the (minimum) standards for land use, then they are rewarded. If they do not meet the standards, then they are not compensated. However, they must be supported through extension services, technical assistance, and subsidies to enable them to meet the standard or generate the desired environmental services.

- Seventh, while the state plays a primary role in the formulation and implementation of a user fee policy in a CAC regulatory structure, it is not the only agent in local watershed management. The third party mediator and organizer of beneficiaries and service providers may either be a local government or non-governmental organization. Furthermore, the standards used, the agreements between parties and the specifications of the user fee policy do not have to emanate from a national legislation or executive order. Instead, they may be the product of local consultation and consensus.

Summarizing some of the above requirements, Figure 2 specifies the tangible services, functions or outputs that the environment provides. It identifies both the natural processes and potential human agencies involved in the provision of environmental services. Among the human providers are upstream communities, establishments, local government unit or environmental agencies. Some of these local agencies may not yet be in operation or are ineffective. Apart from the service providers, various beneficiaries comprise the other party to the agreement. Among the beneficiaries are government agencies, local government, individuals, occupational groups, and private business establishments. Together the providers and beneficiaries constitute the potential market or co-management arrangement that formalizes the user fee and the system of rewards and penalty.

The fee or penalty payment could be determined systematically by valuing the cost of particular environmental services. The value may be estimated by the health, economic and environmental damages resulting from the loss or diminution of services. The last column lists some of the estimation or valuation methods for particular services. The role of the state, local agencies, organizations, and communities is critical in the determination of the estimated cost or valuation method.

Figure 2. Matrix of Environmental Services, Providers, Beneficiaries, Damages and Valuation Method

Environmental Service	Service Providers		Beneficiaries	Damage, Costs	Valuation Method
	Nature	Human Agency			
Surface water volume	• River • Precipitation	Forest (headwater) agency	• Water District • Local government • Concessionaries • Private well owners (household establishments)	• Reduced irrigation services • Lower Agricultural output	• Productivity loss

Environmental Service	Service Providers		Beneficiaries	Damage, Costs	Valuation Method
	Nature	Human Agency			
Groundwater Recharge	• Forest Vegetation • Streamflow • Slope stability • Soil erosion control	• Upstream land management agency • Upstream & riverine community	• NIA • Farmer Irrigators Association • NPC • Hydroelectric power consumers • Fisherfolk	• High energy cost • Lower production & income • Ground water depletion • Increasing energy cost • Prospective future consumers	• Energy cost • Depletion Premium
Surface Water Quality	• Waste assimilation	• Establishments upstream and alongside the river • Water quality protection agency	• Recreation boat travelers	• Income effects of flood or drought • Health and livelihood impacts of water pollution	• Cost of illness • Human capital approach
Recreational		• Resort facility owners • Local government	• Local government • Local business • Labor • Visitors, tourists	• Water pollution • Garbage accumulation	• Health cost • Cost of waste management
Waste disposal (sink) Service	• Body of water • Airshed • Landfill	• Local government	• Garbage producers • Garbage disposers • Polluters	• Water, air, aquifer pollution • Health effects	• Health cost • Mortality risk

2.0 EXPLORING THE IMPLEMENTATION OF A USER FEE SYSTEM IN WATERSHED MANAGEMENT: NUEVA VIZCAYA AND KIDAPAWAN AS ILLUSTRATIVE CASES

2.1 ON THE GENERAL WATERSHED CONDITIONS

My preliminary assessment of watershed conditions in Nueva Vizcaya and Kidapawan, North Cotobato were drawn from a cursory study of existing documents and a limited number of days for data gathering and field appraisal in the two places.

2.1.1 Open access, forestland conversion, and mountain stream diversion

Most forestlands in Nueva Vizcaya and North Cotobato are under open access. In Nueva Vizcaya, for instance, about 78 percent of them particularly those in the lower Magat watershed are without any tenurial instrument. Open access has certainly allowed migrants (for instance, from Arakan in Kidapawan, and from Ifugao and within the province of Nueva Vizcaya) to search for subsistence or livelihood opportunities in the forestlands of the province. A favorite destination of migrants in Nueva Vizcaya has been the cancelled pasture lease areas; in Kidapawan the forest reserves and the prospective areas under the Certificate of Ancestral Land Titles.

Due to illegal logging, upland farming, and other more recent, if not earlier disturbances, like mining in Nueva Vizcaya, mountain creeks and upland streams have been diverted, if not lost. In turn, this has reduced the stream flow of rivers and the volume of water available for domestic

use and irrigation. These disturbances have also contributed to the sedimentation of irrigation canals and intake structures, and the siltation of dams.

In the upland forest areas of Kidapawan, Magpet, Makilala, as well as in Nueva Vizcaya, large commercial farms and small vegetable plots respectively have been established. These land conversions have certainly had an impact on soil erosion and water use; the extent of which, however, must still be validated and quantified.

2.1.2 Earthquake and El Niño effect on water discharge and river flow

Natural disturbances, such as the earthquake in 1990 and the El Nino in 1986, Oct 1998 to May 1999 and the 2002–2003 occurrence have also contributed to the destabilization of the environment in both provinces. The more recent El Nino effect in North Cotobato is said to have been more severe at the start of the year. Together with other factors, the two natural disasters brought about a 50 percent reduction in water discharge during the period.

In Nueva Vizcaya, the earthquake and other factors such as deforestation accounted for the change in the course of river streams. Some no longer flow into the intake structures for irrigation. The earthquake and the deforestation also resulted in the instability of the land. With erosion and slope failures, sediments have accumulated in the riverbeds and caused riverbeds to emerge in the open. As a consequence, most irrigation dams that had been designed 1 meter below the riverbed are now 1 meter above the riverbed. It is estimated that in almost all of the rivers in Nueva Vizcaya, the annual built-up of silt and sediments from 1991 to the present is about 5 meters. Unfortunately, there are no available funds for the dredging of Magat River, watershed rehabilitation, and upstream impoundment dams.

2.1.3 Water shortage for domestic use and irrigation

A water shortage problem has emerged in both provinces. It is not only confined to a particular site. Water has become a problem in upland areas, lowland farms, and urbanizing areas. The problem is manifested in inadequate water supply for both domestic use and irrigation. In some upland areas of Nueva Vizcaya, like Kayapa, Ambaquio, and Kasibu, the water level of intake boxes has declined. Most intake irrigation structures are also unable to provide water in the dry season, and are not able to store enough water in the wet season for later distribution. Irrigation of the lowlands, and possibly the recharge of the aquifer have also been affected by the diversion of upstream surface water resources for upland irrigation and the subsequent reduction of downstream flows. As one moves from the upstream to the downstream areas, the proportion of farms that are irrigated thus decreases. The results seem to be a zero-sum game in the allocation of water between the upland farms and the lowlands.

In District 2 of North Cotobato, for instance, two communal irrigation systems (CIS) have been built in areas with higher elevation, like Mabalcol and Carmen, in addition to the national irrigation system (NIS) in Kabacan. Ironically, the supplemental upstream CISs have affected the production capacity of the Kabacan NIS. Possibly due to the groundwater extraction of the many PNOC wells and the pumping activities of banana plantations in the area, the volume of stream flows has also declined, and may have affected aquifer recharge. In part of the city of Kidapawan, NC and Bayombong-Solano, NV, water is unavailable in particular hours of the day. In District 1 (Pigkawayan, Midsayap, Palma) of North Cotobato, the water table seems to have gone down because the 60 ft deep wells, for instance, built in 1995 now have difficulty in extracting groundwater.

2.2 ON THE DOMESTIC WATER SITUATION

2.2.1 Population growth and increased number of spring boxes and private wells

With the growth of the population in the two provinces, there is greater demand for domestic water in the city and towns, as well as in upland communities. To meet this demand, the provincial and city governments in North Cotobato have provided barangay deep wells. In particular, the provincial government has also financed the construction of spring boxes in the higher elevations near their sources.

In its effort to expand its service area and improve operations, the water district of Kidapawan has begun laying out new pipes and identifying new water sources. At the moment, however, almost all barangays cannot rely solely on the water district. Except for the Poblacion, almost all barangays continue to depend on their deep wells. Some private establishments and households have also established their own wells, more likely without any permit from the National Water Resources Board (NWRB). The single establishment with the most number of deep wells is the PNOC. Further studies must be done to determine whether the increased number of deep wells together with the growing number of spring boxes in the uplands have had negative effects on the water supply in downstream communities.

2.2.2 The financial imperatives of domestic water suppliers

The Water District of Kidapawan supplies the water needs of the city by sourcing its raw water from natural springs and a dam on the Saguing River. At present, it cannot provide water continuously. Neither could it supply water to all parts of the city because of inefficencies, illegal tapping and leakages, as well the district's limited capacity vis-à-vis the growing demand. Aware of the need to expand and improve its facilities, the water district of Kidapawan has raised water rates and began investing in larger transmission pipes. It has also begun planning to tap additional spring sources and establish new deep wells.

The Water District, however, is constrained by its poor financial position and the inability to secure control over its spring sources. These springs are located in an area that is now being claimed by indigenous people who supposedly hold a CADT over the area. Hence, securing access to these water sources requires that the Water District obtain a Memorandum of Agreement with the indigenous people. Whether the indigenous people will agree to a MOA and whether the District could provide attractive terms, given its poor financial position remains to be seen.

Like Kidapawan, the Provincial Water Works of Nueva Vizcaya has the same imperative for expansion and the constraints posed by its financial and supply conditions. Unlike Kidapawan, however, the Provincial Water Works has not been able to raise water rates. It continues to charge a lower rate. This may partly be the reason why it incurred deficits in two years of operation from 19? to 19 ? . During its surplus years, however, it has not been able to set aside funds for capital build up or for investments in new facilities. In order to expand and meet the growing demand for domestic water in Solano and Bayombong, Nueva Vizcaya's Provincial Water Works must tap the excess surface water and divert it away from irrigation. The controversial measure, however, would run counter to the interest of farmers. Unless this zero-sum condition is resolved, new water sources must be identified.

2.3 WATER SHORTAGES AND CONFLICTS

2.3.1 Inadequate irrigation supply and the state of disrepair

Deforestation, earthquakes and natural calamities, and sedimentation have adversely impaired the performance of irrigation facilities within the two provinces. Some facilities could only provide water to 50 percent of the service areas, and are hardly able to supply sufficient water in the dry season. Interestingly, the CIS of District 1, North Cotobato (consisting of Midsayap Beluyo, and Buluan-Pigkawayan of Palma) were said to be in good conditions in the early 1990s. A decade later, however, the CISs could only irrigate half of the area. Because of the more extensive deforestation in District 2, the area faces a much worse water shortage condition.

In an effort to give a semblance of order, the National Irrigation Authority has resorted to water rationing. This remedial approach, however, could not foster cooperation among farmers nor could it prevent them from pursuing interests that may be inimical to long-term water supply.

Farm communities at higher elevations in Nueva Vizcaya seem to have an advantage over lowland farms. Upstream communities apparently are able to get prior access to the water and divert it to their farms to the consternation of their lowland counterparts. Organized in irrigation associations, downstream farmers complain that upland farmers have illegally tapped and diverted water or have drawn water from the association's impoundment dams. They also complain that the land clearing and farm practices of upland farmers have caused the siltation and sedimentation downstream and adversely affected the delivery of irrigation services. Hence, the lowland farmers call for restricted access to upland farm holdings, land clearing activities, and particular farm practices. Conflict has therefore emerged between upland farmers and some irrigation associations.

Conflicts, frustrations and disorganization are also present within the irrigation associations. Probably as a manifestation of the free-rider problem, if not the state of disrepair of the facilities, many farmer-members neither pay their irrigation service fee nor provide labor for canal maintenance. Farmers seem to have resorted to individualistic behavior, such as gathering their own water supply and storing them in man-made lagoons or stealing water from their neighbors. Possibly the lack of leadership and appreciation for collective action has contributed to the problem, apart from the low ability and lack of willingness to pay among irrigation users.

2.3.2 Conflicts to be resolved

Figure 3 shows the various stakeholders identified in the above discussion and the possible matrix of social relations among them. The positive sign (+) reflects the solidarity or shared interest between two cooperating groups while the zero (0) mark signifies the absence of information or relationship between two groups. The negative sign (-) indicates the possible conflict existing between two groups, such as between the water district and indigenous people or irrigation association, or between the irrigation association and upland farmers, on the one hand, and the indigenous people, on the other, or within the association itself. Apart from outright conflict, the negative sign within the irrigation association may reflect the failure of the association to organize collective action. Note that conflict might also exist between the spring box users and unirrigated farm holders and upland farmers.

A negative (-) relationship reflects the presence of conflict between two groups and the need for its resolution. The movement towards a more positive relationship is desirable for watershed management. The absence of a sign in most cells in the matrix indicates the lack of field (ethnographic) research on the relationships of various groups within the watershed. Further research will establish whether the Water District has an unpopular status among groups with potential or apparent conflict with it, such as the indigenous people, upland farmers, irrigation association, private well owners, and urban households. Field studies will also be able to verify

whether plantation farms have negative relations with indigenous people, upland farmers, spring box users, irrigation association, water district, and private well owners.

Similarly, studies will determine the apparent effect of upland farmers and spring box users on other groups. A cursory survey of the communities gives the impression that some groups are unaware of the effect of particular groups on their need for environmental services, hence a zero (0) mark. For instance, private well owners and spring box users seem to have no effect on other groups.

Figure 3. Matrix of Social Relations Among Stakeholders

	Indigenous People	Upland farmers	Spring Box Uses	Plantation Farmers	Irrigation Association	Unirrigated Farms	Water District	Urban Households	Outsiders
1. Indigenous People	+								
2. Upland Farmers	+ -								
3. Spring Box Users		-							
4. Plantation Farmers									
5. Irrigation Association		-			+ -				
6. Unirrigated Farms			-						
7. Water District	- +	-			-				
8. Private Well Owners							-		
9. Urban Households							+ -		
10. Outsiders	0								

3.0 A USER FEE SYSTEM FOR WATERSHED MANAGEMENT IN NUEVA VIZCAYA AND KIDAPAWAN

3.1 GUIDELINES FOR USER FEE DEVELOPMENT IN THE TWO PROVINCES

The following critical steps must be undertaken to institute a user fee system.

First, environmental education is fundamental to the promotion of an environmental user fee system. It is imperative that information on the current state of environmental services is disseminated and that public awareness of the complex natural processes that generate concrete environmental services and the impact of particular human activities on the watershed's regulation functions is heightened. People should know the importance of particular services to specific groups, the provisioning of particular inputs or desirable production conditions by the environment, the effect of the absence of these services on economic production and incomes, and the actions that need to be taken.

Moreover, environmental education and economic literacy are necessary to address the low level of willingness to pay of resource users or the free rider mentality. Note that some farmers do not pay the irrigation service fee while private commercial well owners resist payment for raw water extraction partly because they have gotten accustomed to getting free environmental services. The object of environmental education and economic literacy is to get the commitment or willingness of environmental service users to pay for the services.

Second, the environmental service that is being demanded, as well as the groups demanding it ought to be identified and defined. The demand for particular environmental services may not be apparent immediately because they are products of complex natural, environmental processes that may not be tangibly felt. Demand seems only to be apparent when a shortage of a particular service is experienced, such as inadequate water or irrigation services, excess runoffs, unstable or declining soil quality, river pollution, or fishery depletion. In other words, the poor state of an environmental service underlies its demand. Hence, there is a particular desirable quality of the service that is being demanded.

Third, the demand for environmental services can also be made more apparent if they are represented as more tangible products, such as regular stream flows, water reservoirs, erosion or flood controls, improved/ unpolluted water quality conducive for fish growth, and soil moisture. As potential commodities whose production must be ensured, it is necessary to specify the activities that are required in the production of environmental services. These activities, moreover, must not only be conceptualized. They must also be organized and implemented as an arrangement, technology, project, or contract. For instance, a watershed protection contract entails a set of the best land resource use and management practices while an arrangement for soil and water quality improvement consists of reforestation projects, upland farm practices, land techniques, river protection and monitoring, and waste disposal methods.

The set of required activities guaranteeing the provision of environmental services are similar to the CAC "standards". They explicitly set the allowable conditions or requirements for the provision of environmental services or the so-called positive externalities. Corollary to these requirements, the disallowable conditions or the activities to be avoided or abated because they can damage the watershed's regulation functions may also be included in the arrangement or contract.

The explicit enumeration of the desirable requirement activities and those to be avoided serves as a basis to define the terms, rights and responsibilities of the parties involved, and the mode of compensation. Upland or upstream providers are compensated or rewarded when they meet or exceed the (minimum) standards for land use. If they do not meet the standards nor provide the

inputs for environmental service production, then support must be given in the form of extension services, technical assistance, and maybe even subsidies under established priority conditions.

Fourth, the state of the environment and the country's level of knowledge with regards to the generation of environmental services determine the required activities or standards that must be established. Given the extent of environmental degradation in the country, the arrangements and projects that should be promoted must be inspired by a more developed science. Specifically, there is a need to develop the science and practice of improving local climate conditions, mitigating the damaging effects of natural disturbances, and restoring and enhancing nature's productive capacity. The successful experiments in soil quality and water yield improvement and conservation, agro-forestry, local climate changes from vegetation changes, reforestation for land stability, water generation, flood and wind protection, and other measures must be replicated and improved.

Fifth, given the absence of a market or the natural coordination of providers and demanders of environmental services, a third party is needed to undertake the following functions in the establishment of a user fee system for watershed services. The third party would be responsible for identifying, meeting, and securing commitments or willingness to pay on the part of demanders of environmental services. As noted earlier, so long as the conditions of non-excludability and non-rivalry hold, there would be no incentive on the part of individual consumers of services to pay for the benefits unless they come as a group to an agreement that as beneficiaries they would willingly pay for the environmental services they use. It is critical to get the commitment of key beneficiaries in the river basins, such as the National Irrigation Authority, the National Power Corporation, the Water District, Bureau of Tourism, the large plantations, and large city and municipal governments. Public enterprises and government departments are the single most important buyer of watershed services who have a clear interest in maintaining the quality and flow of water.

The third party would also be responsible for identifying the potential local suppliers who would ensure an adequate supply of particular environmental services, drafting the prospective contract or arrangement, and establishing consensus among demanders and suppliers on the proposed arrangement. It is in the proposed arrangement or joint agreement between the consumers and providers of environmental services that the user fee or cost of such services and the rights and duties of each party would be formalized. Before this stage is reached after the above initial organizing tasks, the third party would also have to act as a mediator of conflicts between demanders and suppliers, and among themselves. Conflicts, for instance, in Nueva Vizcaya and North Cotobato between upland farmers and downstream irrigation associations and provincial water works, and among the irrigation association members must be resolved. Before any agreement can be formed, conflict mediation and resolution is necessary.

Another necessary condition is the provision of incentives and funds for investment in order to address the disincentive and under-investment problem that accompany the free-rider problem and absence of property rights. The task of the third party to pool together the financial commitments of key public enterprises and government agencies as seed money for the establishment of an environmental fund is crucial to this objective. Who then can undertake all the above functions? With its resources and influence at the local level, the provincial government is in the best position to organize the prospective environmental service providers and demanders, serve as mediator, provide and guarantee property rights, solicit seed money for the environmental fund, and provide investment incentives. As the third party, the provincial government is in effect the instrument of co-management.

APPENDIX

FUNCTIONS OF THE NATURAL ENVIRONMENT

Production Functions	Carrier Functions	Regulatory Functions	Information Functions
Oxygen	Space for human	Protection against harmful cosmic influences	Scientific and educational information
Water	Cultivation, animal husbandry, aquaculture	Regulation of local and global energy balance	Historic information (heritage value)
Food, nutritious drinks	Energy conversion	Chemical composition of the atmosphere	Cultural and artistic information
Genetic and medicinal resources	Recreational and eco-tourism	Local and global climate	Aesthetic, religious, and spiritual
Raw materials (clothing, building, industry)	Nature protection	Prevention of runoffs and floods	
Bio-chemicals, fuel and energy		Water catchments and groundwater recharge	
		Control of soil erosion and sedimentation	
		Topsoil formation and soil fertility maintenance	
		Fixation of solar energy and biomass production	
		Storage and recycling of organic matter/nutrients, human waste	
		Regulation of biological control mechanisms	
		Maintenance of migration and nursery habitats	
		Maintenance of biological, genetic diversity	

Source: de Groot, 1994