NAIVASHA – MALEWA PAYMENTS FOR ENVIRONMENTAL / WATERSHED SERVICES

FEASIBILITY STUDY OVERVIEW

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Introduction

1. CARE Kenya & WWF EARPO Payments for Watershed Services Feasibility Study

CARE and WWF have embarked on a joint project to implement a payments for watershed services (PWS) initiative (the Programme) in the Malewa River Basin which is the primary source of water for Lake Naivasha. The first phase of this project has comprised a feasibility assessment which will determine the whether there is a viable "business case" for the proposed PWS initiative from the perspective of the potential buyers (users of water from the Malewa River and Lake Naivasha), and the potential sellers (rural communities farming the agricultural lands of the upper Malewa catchment).

This PWS initiative in Kenya is linked to a global PWS programme of CARE and WWF which aims to promote greater social equity in PWS such that PWS delivers significant livelihoods benefits to rural communities as well as environmental benefits to downstream water users. This global programme has invested substantial resources in developing a comprehensive feasibility assessment process, and this Kenyan initiative will apply this same process. Assuming a successful outcome of the feasibility assessment, this Kenyan initiative will then be eligible for inclusion in phase 2 of the global programme and thus funding under this programme.

The feasibility assessment is a one year process which started in July 2006. During the first six months the main emphasis was on hydrological studies to characterise the problem of declining water quantity and quality and determine whether land use/management interventions in the Malewa "upper-catchment" could address this problem. During the second sixth months the emphasis was on studies ascertaining whether there were likely to be positive economic and livelihood benefits associated with Programme implementation. Key studies conducted to date in relation to the feasibility assessment include:

▪ **Hydrological Assessment**	July 2006 – May 2007
▪ **Hotspot Riparian Mapping**	June / July 2007
▪ **National Legal & Policy Assessment**	August 2006
▪ **Livelihood Assessment**	May – July 2007
▪ **Local Level Legal Assessment** (carried out jointly with the livelihood assessment)	May – July 2007
▪ **Sellers' Cost Analysis / Upstream CBA**	May – July 2007
▪ **Environmental Screening**	May – July 2007
▪ **Programme Cost Benefit Analysis**	May – July 2007

Two further studies, the Stakeholder Analysis and Carbon concept paper are not addressed within this report. The stakeholder analysis is split between Cost Benefit Analysis and the National Legal & Policy Assessment. The Carbon concept paper will form a secondary paper,

to be annexed to this report upon finalisation, which concept paper will now be likely linked to the CARE / WWF / ICRAF LULUCF toolpack currently under development.

2. Report Purpose

The purpose of this report is to synthesise the key findings and recommendations of the above studies in order to inform Phase II Programme design within the context of global approaches to PWS / PES and the nature of the resource management questions facing Lake Naivasha. This report seeks to synthesise answers to the following key questions:

1. Can land-use change upstream improve downstream watershed service provision?
2. Would improved watershed service provision provide economic benefits to downstream watershed service beneficiaries?
3. Are there potential buyers of watershed services?
4. Are there willing sellers of watershed services?
5. Would payments for watershed services be legal in Kenya?
6. Are the livelihood consequence of a payments for watershed services programme likely to beneficial to upstream communities?
7. Are property rights in upstream areas sufficiently clear for payments (in cash or kind) to be made and for contingency to be secured?
8. Are downstream environmental benefits and increases in on-farm productivity mutually exclusive?

3. Report Structure:

This report is structured as follows:

PART I provides an introduction to the environmental problems facing Lake Naivasha.

PART II provides an overview of the PWS / Payments for Environmental Services (PES) concept and frames the questions posed above.

PART III provides an overview of each of the above key component studies and concludes on key questions.

PART IV draws together the recommendations of each of the component studies, together with wider experiences of PES globally, in order to inform project design for an equitable payments for environmental / watershed services scheme.

Readers familiar with the PES / PWS concept and conditions required for PES / PWS implementation could skip from Part I directly to Part III which reports on component feasibility studies.

4. Conclusions

In respect of the questions set out in Section 2 above, the following answers are provided by the feasibility study:

Key Questions	Answer	Comments
1. Can land-use change upstream improve downstream watershed service provision?	Unproven	Hydrological model shows land-use change can reduce sediment yield at the sub-basin level. The impacts of this downstream remain to be proven during Phase II.
2. Would improved watershed service provision provide economic benefits to downstream watershed service beneficiaries?	Yes	The benefits appraisal component of the CBA suggests this to be the case.
3. Are there potential buyers of watershed services?	Yes	Yes, following the conclusions of the benefits appraisal component of the CBA.
4. Are there willing sellers of watershed services?	Yes	Yes, as indicated by informal gauging during the Livelihoods Assessment.
5. Would payments for watershed services be legal in Kenya?	Yes	See Policy & Regulatory Study.
6. Are the livelihood consequence of a payments for watershed services programme likely to beneficial to upstream communities?	Unproven	Upstream Sellers' Costs Analysis suggests there are significant on-farm benefits to PWS participation. The Livelihoods Assessment indicates that gender differentiated control of farm resources must be accounted for in mechanism design.
7. Are property rights in upstream areas sufficiently clear for payments (in cash or kind) to be made and for contingency to be secured?	Yes	See Local Level Legal Analysis.
8. Are downstream environmental benefits and increases in on-farm productivity mutually exclusive?	Unproven	Upstream Sellers' Costs Analysis suggests that long-term benefits exist, but a question remains as to whether the programme can be designed to fit with increased short term productivity increases.

The extent that the questions are answered broadly in the affirmative provide justification for Phase II implementation of the PWS Programme. That 3 of the key questions remain unproven does not render the Programme unfeasible, but specifies the need for programme managers to place emphasis in catering to concerns about viability of certain components of the Phase II Trial roll-out.

5. Recommendations

This overview report provides the following key recommendations:

Hydrological

- PWS intervention can only bring about changes in water quality. As such, the scheme should be "sold" to private sector participants on this basis.
- The relationship between catchment land-use change and lake health is uncertain. As such, Phase II can only be 'sold' as a trial phase.
- If funds can be made available during Phase II, it may be possible to generate a better understanding of catchment hydrology and the lake / catchment relationship, which

improvement in scientific understanding would be vital to an efficient scaling-up during Phase III.

- The PWS Programme should take a 2 pronged approach, one in which payments are made for land conservation measures on farmland and another for riparian restoration and maintenance given the degraded condition of certain stretches.
- Depending on the scale of available finances, the programme may be able to also focus on degraded riparian areas outside of the principle areas and where there may be significant efficiency gains in so doing.

Legal

- That with capitalisation of the programme by private investors, the PWS Programme is not impeded in law from roll-out.
- Endorsement should be sought from state actors for the Programme, which will make negotiation with WRUAs less problematic.
- Kenyan water sector policy is firmly focused on implementation of WRUAs at a community level. The PWS Programme should seek to enhance such community participation in watershed management by using WRUAs to secure land-use change within watercourse riparian zones.
- Payments (cash or kind) should also be made to individual land-owners so that individual incentives for improving conservation measures are not diluted.

Economic

- Land should not be taken out of productive use.
- The CBA, weak assumptions aside, provides necessary financial justification for Programme implementation.
- Given the exploratory nature of Phase I, it is prudent to take the least cost approach, which would see Phase I rolled-out in the Mkungi – Sasini sub-basin utilising 10m grass crop stripping methodology.
- Preliminary estimates cost the Phase II trial and Phase III roll-out within other sub-basins utilising 10m crop strips at USD 2.08 million, with a present value of USD 1.49 million over 8 years.
- Given the relatively low cost of riparian zone restoration, this could (subject to administrative constraints) be trialled in all three priority sub-catchments.

Livelihoods / Local level legal

- From a livelihoods perspective, there is justification for PWS, although the study urges careful programme design.
- Land should not be taken out of productive use.
- Recipients of payments should take a lead in specifying types of compensation.
- Cognisance must be given to the potential for the scheme, in rewarding land-owners (men) to have a potentially harmful impact on women. In designing the compensation mechanism it may be necessary for a component of the payments to be provided in the form of services which women are likely to use.

PART I: BACKGROUND TO THE RESOURCE MANAGEMENT ISSUES IN THE LAKE NAIVASHA CATCHMENT

Lake Naivasha in Kenya is situated on the floor of the Eastern Rift Valley 80 kilometres from Nairobi and covers approximately 140km^2. As a wetland of international importance and regularly supporting more than 20,000 waterfowl or 1% of several species of waterfowl, the lake is a designated "Ramsar Site".

Lake inflow is fed by the higher altitudes of the Rift's flanks. Two river systems, the Gilgil and Malewa, feed the lake from the north and north east segments of the catchment (Becht and Harper, 2002). On the eastern, western, northwestern and southern side of the catchment, no surface water reaches the lake. Drainage from the upland Mau Hills and Eburru Forest infiltrate before they reach the lake (Clarke *et al* (1991), cited in Becht and Harper, 2002).

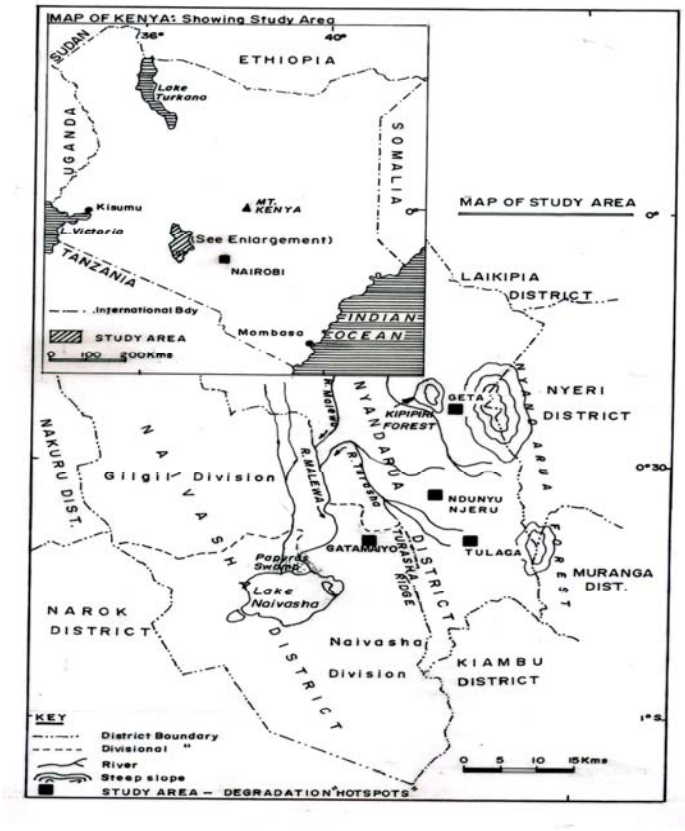


Figure 1: Map showing project area (from Makenzi *et al*, 2007)

The catchment supports a number of downstream WS beneficiaries, primarily through the regulation of water quality and quantity in Lake Naivasha and catchment aquifers. The most prominent beneficiary of watershed services is the floriculture sector, which irrigates crops using lake, river and borehole extracted water. Approximately 60-70% of Kenya's cut flower exports originate from the Lake Naivasha area (Mutiso, 2006), contributing nearly 1% of Kenyan GDP and 5% of foreign export earnings (Bolo, 2006). The sector employs approximately 16,000 workers directly and 32,000 workers indirectly (Mutiso, 2006). A further user of the lake's water is the KenGen Ol Karia geothermal power plant which supplies 15% of Kenya's electricity.

The lake is also a significant tourist destination, with 40,000 foreign and domestic tourists visiting the lake in 1998 (Becht *et al*, 2006), the last year for which figures are available.

Recent press attention in both Kenya and Europe (for example, Times (London), 28 March 2006) has brought into public focus certain threats to the lake's sustainability. These threats are relatively well documented in the academic literature, although an imprecise understanding of catchment hydrology and lake ecology has generated considerable controversy as to the cause of these problems (Becht *et al*, 2006). Primary threats are perceived to be to lake water balance, quality and aquatic ecology, which are detailed further below.

1.1 Water Balance

Long term lake level decline, in evidence throughout the 20th century, has been exacerbated by abstraction of catchment water by horticultural growers. Becht *et al* (2006) observes on the basis of hydrological modelling that irrigation of commercial crops has led to a 3-4m decline in lake levels since the 1980s. Given current use levels, Becht and Higgins (2003) estimate that lake size will "equilibrate at about 30km$^{2"}$, which is roughly 1/3 of its current size.

This relatively clear picture of causation presented by Becht *et al* (2006) and Becht and Higgins (2003) is confounded by two factors. Firstly, lake water balance may have been affected by land-use change in the wider catchment which has included widespread encroachment by cultivation onto forested land with the result that more water falling on the catchment reaches the lake as surface flow, rather than groundflow (Rural Focus, 2006). Whilst this is likely to reduce lake levels, the precise effect of land-use change on catchment hydrology is unknown (*ibid*).

Secondly, levels of Lake Naivasha are subject to significant natural fluctuation. Verschuren *et al* (2000, cited in Becht *et al* 2006) have identified four periods in the last 1,000 years where the lake has dried up, as well as periods with higher water levels than at present. There are also shorter term fluctuations in lake levels, the periodicity of which has been linked to El Nino events (Vincent *et a,* (1979), cited in Becht and Harper, 2002).

1.2 Water Quality and Aquatic Ecology

There exists a marked lack of consensus in relation to the lake's health. Whilst the lake was classified hypertropic after the El Nino floods in 1997/8 and eutrophic in 1998/9, Becht *et al* (2006) report there is little concern that, given current lake stresses, an ecological "tipping point", could be reached for Lake Naivasha whereby the lake ecosystem switches irreversibly from one stable state to another. By contrast, Harper (*pers comm*, 2006) argues that eutrophication could permanently disturb the lake's ecosystem within 5 to 10 years, although

following recent El Nino related rains, water quality is judged to be its highest for 30 years (Harper, *pers comm*, 2007).

Harper and Mavuti (2004) identify a number of causes of this problem, including over-abstraction of catchment water by horticultural growers, growing population around the lake leading to physical pressure on lake shores and pollutants flowing into the lake from human settlements, industry and agriculture. Of these nutrient input into the lake is the greatest concern (Harper and Mavuti, 2004). Berrihun (2004) shows that the major sediment / nutrient input originates in inflowing sediment from the upper Malewa River (the "upper catchment") (cited in Becht *et al*, 2006). Bect (*pers comm*, 2007) asserts that nutrient sources are geographically focused, restricted to the Malewa Gorges and Kipipiri.

However, defining causation is controversial. Becht *et al* (2006) state that there are many unverified claims made about volume of water abstractions, the effects of deforestation (particularly in the "upper catchment"), river sediments accumulating in the lake, the effects of agrochemicals used by commercial growers and smallholders in the upper catchment.

Given that scientific opinion is uncertain as to whether upper-catchment land-owners and resource managers generally provide sub-optimal levels of environmental services, it is unclear whether the PWS Programme must seek to encompass both; providing incentives for enhanced levels of environmental service provision in degraded areas and providing incentives for continued provision of optimal levels of environmental services where conservation measures are already in place.

PART II: BACKGROUND TO THE PAYMENTS FOR ENVIRONMENTAL / WATERSHED SERVICES PRINCIPLE

There is a marked paucity of *ex-ante* assessments for pro-poor PES / PWS implementation. What exists tends towards statements of high level principle, rather than studies using well-established economic tools and livelihood appraisal to facilitate environmental management. Therefore, the purpose of this section, within the context of discussion of the conceptual basis of PES, is to examine criteria for pro-poor PES implementation and to frame the key questions raised in Section I. This justifies research tools employed and provides a basis for conclusions to be drawn regarding the feasibility of PWS in the Naivasha catchment. Additionally, this Part II seeks to develop an understanding of the factors likely to influence pro-poor PES welfare outcomes.

2.1 Defining PES

PES seeks to translate demand for ES, via the market, into payments to the providers of environmental goods and services, the value of which is otherwise unaccounted for in market transactions. Such payments are incorporated into resource managers' land-use decision calculus, theoretically incentivising ES production at efficient socioeconomic levels. PES schemes have their progenitor in Coase Theorem, which specifies that in a free market with clearly defined property rights, socioeconomic gains in efficiency "are independent from the direction of the payment and also from the initial endowment of property rights" (Kosoy *et al*, 2006).

Starting with Landell-Mills and Porras (2002), academics and practitioners have sought to categorise a wide range of projects as PES[1]. As a consequence, no clear and widely accepted definition for PES has emerged, although a consensus has formed around a broad description which views PES as any spending with intended ecological or environmental returns (Wunder, 2005).

The absence of a widely-accepted description has led to recent attempts to formalise a definition for PES. Wunder (2005) validly creates 'policy space' for PES by differentiating it from other approaches to conservation in terms of "directness" and "use of economic incentives"; implying thereby that it is something distinct (see figure 2 below).

[1] These range from more established carbon sequestration projects to eco-tourism projects, which share more in common with Integrated Conservation and Development projects ("ICDPs") (Robertson and Wunder, *forthcoming)*.

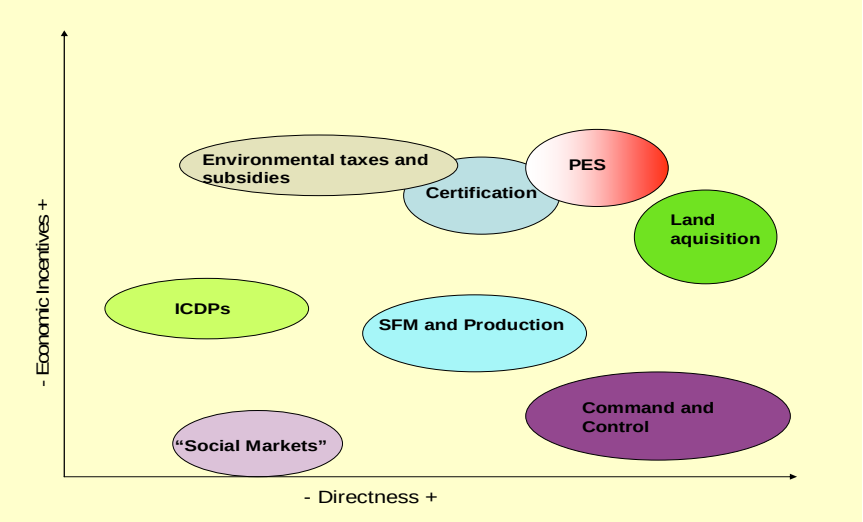


Figure 2: PES distinguished from other policy tools (source: Wunder, 2005)

Robertson & Wunder (*forthcoming*) in a further attempt to give PES a distinct form, set out five criteria to describe the PES principle:

1. a voluntary transaction; where
2. a well-defined ES (or a land-use likely to secure that service);
3. is being 'bought' by a (minimum one) ES buyer;
4. from a (minimum one) ES provider; and
5. if and only if the ES provider secures ES provision (conditionality).

2.2 Categorisation of PES

Under the broader 'payments for environmental returns' conceptualisation, a review of the literature allows for a differentiation of PES schemes according to transactional structure, specifically the character of market fora, buyers and sellers. Figure 3 provides a simple conceptual basis.

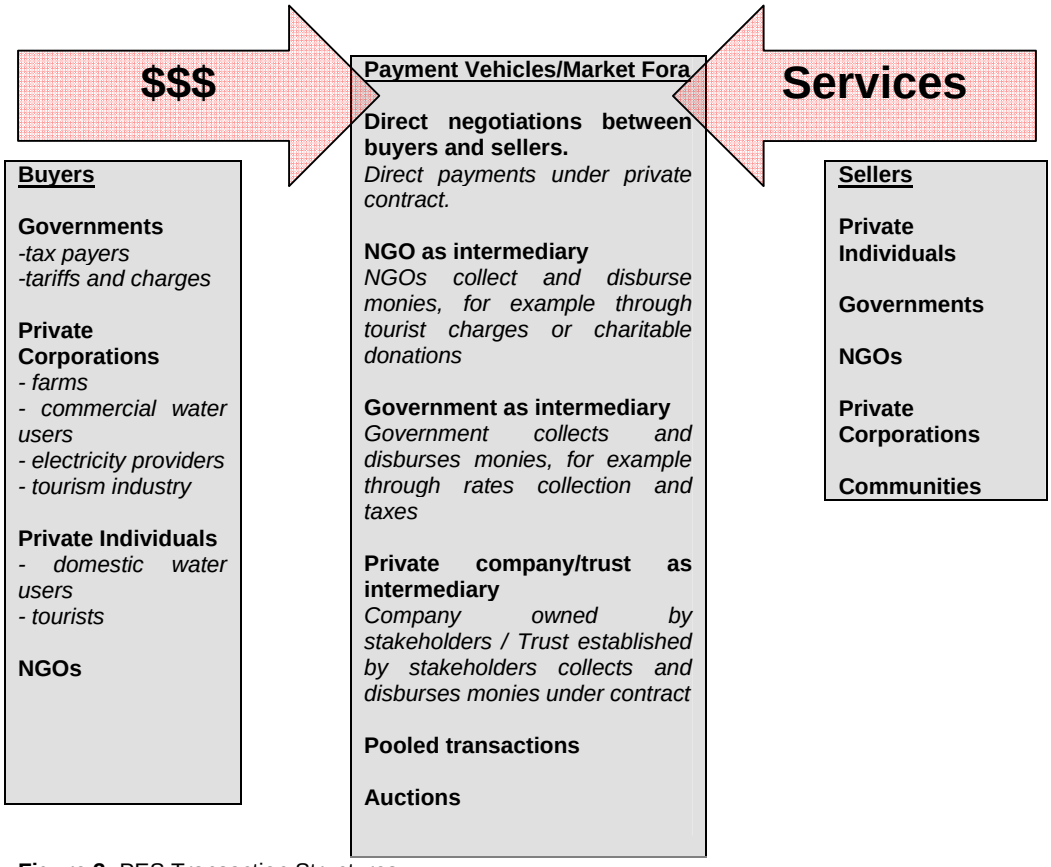


Figure 3: PES Transaction Structures

This conceptualisation excludes a requirement for voluntary payments, although it is conceded in relation to Robertson and Wunder's (2005) set of criteria that certain PES schemes are more purist in market orientation than others, seeking to optimise efficient allocation of environmental resources. However, as is explored in greater detail below, resource allocation is not necessarily the sole objective in implementing PES and alternative or dual objectives, such as equity gains to supposedly poorer resource managers, may require market intervention and therefore a modification of PES transaction structure.

2.3 Payments for Watershed Services

PWS envisages remuneration to upstream communities which provide WS to downstream beneficiaries and can include payments for increased water quality, water quantity and flood control (Scherr *et al, forthcoming*). PWS is also thought to be an effective means to control non-point source pollution, resulting from aggregated individual actions carried out by geographically contiguous and homogenous agents (Kosoy *et al*, 2006) and therefore presents a solution to frequently widespread watershed degradation.

Whilst the PWS literature focusing on watershed degradation is primarily focused on the positive externalities delivered by forests to downstream WS beneficiaries (for example Powell *et al*, 2002; Pagiola *et al*, 2004), Kosoy *et al* (2006) indicate that other land uses can also deliver improved WS, for example "no burning before, during or after planting,

construction of vegetal fences, irrigation ditches and fences…and implementation of organic agriculture". The Naivasha catchment is only partially forested and as such alternative land uses, such as those highlighted by Kosoy *et al*, are of direct relevance.

Private payments for WS have significant pro-poor potential (Scherr *et al forthcoming*) owing to supposed upstream/downstream wealth clines in tropical watersheds. Despite this potential the market remains undeveloped; global private payments for watershed services totalling only USD 5 million annually (Ecosystem Marketplace Matrix, 2006).

2.4 Pro-poor PES

Certain authors have suggested that PES could contribute to poverty reduction by transferring wealth from ES consumers to supposedly less affluent ES providers (for example Landell-Mills and Porras, 2002; Pagiola *et al*, 2005). Various case studies demonstrate the plausibility of this contention. For example, Echavarría *et al* (2004) show that certain ES providers in Ecuador derive 30% of their household spending on food and medicine from PES. Wunder (2005) points to the further non-monetary benefits of PES such as increased social capital through improved internal organisation and business dealings with the outside world, increased land tenure security and improved visibility of ES providers to both donors and public entities.

However, "PES is a policy tool appropriate to certain circumstances and not others", which circumstances should be considered when contemplating PES (Powell *et al*, 2002). These circumstances include:

- an economic value for the environmental services which are being provided
- potential buyers and sellers
- an appropriate legal and regulatory context
- property rights

These "circumstances" or specifications for PES, considered further below, appear to remain unchallenged by the literature and thus form a useful template for framing approaches to pro-poor PES.

2.5 An economic value for the environmental services which are being provided

Powell *et al* (2002) state that "to generate willingness-to-pay, it is critical that beneficiaries recognise the value of environmental services for their welfare".

Whilst this is not incorrect, it presupposes certain economic conditions exist. Firstly, PES is only viable under conditions of scarcity, where "an emerging scarcity makes [ES] potentially subject to trade" (Wunder, 2005). Moreover, Powell *et al* (2002) assume that where ES

beneficiaries ascribe economic value to environmental resources, access to these resources is regulated and not an open access-regime. Under an open-access regime, the ensuing "race to the bottom" (Hardin, 1968) may diminish beneficiaries' willingness-to-pay. Where profit maximising private agents perceive that investments in ES provision are unlikely to see a return owing to resource depletion, then firm theory suggests that such investments will not be made on a 'willing-buyer' basis.

2.6 Potential buyers and sellers

Powell *et al* identify that "the existence of funds sufficient to deliver regular delivery of the environmental service" (2002) is an important precondition to the creation of a PES mechanism. This is of particular relevance to a developing economy such as Kenya where ability to pay for ES may be restricted.

2.7 An appropriate legal and regulatory context

Powell *et* al specify that developing market instruments for environmental services requires "a unique set of…governance structures". Whilst it may be true that PES implementation is facilitated by a supportive legal and regulatory environment, that such structures be "unique" discounts the flexibility in implementing PES which Landell-Mills and Porras reveal in their review of diverse PES mechanisms in operation around the world (2002). This specification further neglects the wider policy context in which PES is located. *Laissez-faire* or market liberal economic frameworks provide for contractual freedom for "willing-buyers" and "willing-sellers" and such conducive economic or regulatory structures are today far from unique.

2.8 Property Rights

Whilst defined and secure property rights form part of the legal or regulatory context, Powell *et al* identify such rights as a separate specification for assessing PES feasibility. It is argued that "property rights are particularly important" and that where rights over services are not clearly defined, creating a PES mechanism will necessitate the clarification or assigning of rights (Powell*,* 2002). This specification is discussed in greater detail in relation to pro-poor PES transaction design below.

This set of specifications for PES creates a useful template for a programme of feasibility studies such as this which assesses the potential for pro-poor PES implementation. However, as demonstrated, they are possibly over-simplistic and do not give sufficient consideration to the growing concern that, following the Tinbergen rule (Tinbergen, 1956), one policy tool cannot adequately achieve two policy outcomes. Certain case studies qualify this concern. For example, Zbinden and Lee (2005) indicate that PES in Costa Rica are disproportionately directed towards large farmers and forest owners.

Recognising that markets theoretically achieve efficient allocation of resources and that equity gains within the context of PES can only be coincidental, Zilberman *et al* (2006) demonstrate that successful implementation of pro-poor PES is dependent upon a negative correlation between productivity and ES provision, poorer farmers providing the best ES and balanced land distribution, as PES may displace smallholders dependent for cash on income from larger farms. Particular cognisance should be given to this point in implementing a PWS programme in Kenya where the poor are disproportionately reliant upon agricultural livelihood modes for subsistence and where national poverty alleviation strategies are geared towards boosting agricultural productivity. Programme design should specifically attempt to break the supposed link between on-farm productivity and ES service provision. Conceptually, this is not problematic given the on-farm incentives which increased productivity provides for on-farm conservation measures (for example Pagiola, 1998), which in the Naivasha case could also provide external downstream benefits.

Whilst these criteria are highly useful in informing the direction of this study, the emphasis on 'specifications' by commentators such as Zilberman and Powell *et al* downplays or ignores critical issues relating to the effects of PES at a household level and of PES on poor people not selling ES, such as are identified by (Pagiola *et al)* (2005) in a review of existing PES schemes. Such implications should inform PES implementation, yet little recognition is given in the literature to the way in which livelihoods, patterns of resource use and rights to resources may shape PES welfare outcomes or, pertinent to this Programme, how PES can be structured to better achieve pro-poor outcomes.

2.9 Local Livelihood and Institutional Structures: Implications for PES Design

The apparent gap in the literature linking PES design to local livelihood and institutional structures stands in contrast to the recognition that welfare effects of PES depend critically upon property rights (Swallow *et al*, 2005) and an established volume of literature demonstrating the critical role that property rights plays in effective natural resource management.

Property rights, defined for the purposes of this study as "social institutions that define…the range of privileges granted to individuals to specific assets" (Meinzen-Dick *et a,* 2006), critically affect decision-making regarding resource use (Libecap, 1989, cited in Ensminger (1992)). Where land-users are encouraged to adopt more sustainable land practices, those land-users need to be assured of rights to land for sufficient lengths of time such that returns to land-use change can be achieved (Swallow *et al*, 2005).

However, as identified by Pinstrup Anderson, the links between property rights and natural resource management are not always straightforward (2006). Property rights are characterised as "dynamic institutions that change according to a number of factors, such as

population density, resource scarcity and market access" (*ibid*), with the implication that such influences impact on land-use change over time.

On a simpler construction, Powell *et al* (2002) note that societies differ in employing customary and legal rights to govern access to resources and that such property rights are "often insecure, overlapping and contested" (*ibid*). Meinzen-Dick (2006) argues that "the institutional framework which enforces property rights may comprise multiple sources of authority" and recommends that analysis of property rights "employ[s] the perspective of pluralism" recognising both the importance of statutory and customary rules as well as the fact that these legal and normative frameworks overlap in relation to property rights.

However, more recently, commentators have drawn attention to a further confusion of the inconsistencies between customary and legal rights over property. For example, Ochiang (2006) draws attention to the erosion of customary rights owing to increased population pressure, scarcity of resources and failure by communities to self-monitor. This phenomenon has seen previously controlled resource access in certain areas of Kenya disintegrate into unregulated or open-access regimes. It is unclear what the implications are for PES of such developments.

Further, given the poorly understood inter-linkage between property rights and natural resource management practices (Meinzen-Dick, 2006) it is unclear how diversity of tenure may impact implementation of PES in Kenya.

Meinzen-Dick (2006) argues that to understand the function of property rights in governing access to resources, "it is necessary to begin, not with formal laws, whether state, religious or customary, but with individuals". This micro-level approach is adopted in the qualitative elements of this study in order to better understand the implications of property ownership, land distribution and the nature of access to resources which are likely to affect PES outcomes.

2.10 Pro-Poor Policy Objectives in PES Transaction Design

Approaches to property rights suggest that such rights are not only a precondition to PES as per Powell *et al's* (2002) specification but that an understanding of rights and their interlinkages with livelihood structures and natural resource management should also inform PES design. In particular, certain PES transaction structures are more likely to be conducive to pro-poor outcomes.

Firstly, where policy-makers seek only gains in environmental efficiency, then direct contracting for ES provision between buyers and sellers is appropriate as theory suggests

markets will allocate resources efficiently. However, where policy objectives include wealth redistribution, market intervention may be required.

Secondly, an understanding of property rights and the structure of livelihoods around such rights raises questions as to who should be rewarded. Wunder (2005) questions whether only property rights holders should be rewarded, or whether payments can be directed towards resource users too, which would include squatters, or specifically in Kenya, those using land for which statutory or customary rights of access have broken down.

Where pro-poor objectives are pursued, there are explicit trade-offs between environmental efficiency and returns to ES investment which must be negotiated by policy-makers and accepted by ES buyers (Kosoy *et al*, 2006).

However, it should be understood that markets are tools for efficient allocation of resources, and any equitable or sustainable gains may only be coincidental. Economic theory suggests one tool should be used to address one goal, which suggests that PES should be deployed in coordination with other rural poverty alleviation programmes where development synergies are sought.

2.11 Bases for assessing pro-poor PES feasibility

Part II has identified, discussed and developed established criteria against which to frame the objectives of the CARE / WWF feasibility study. Certain conditions can thus be set for programme implementation:

PART III: COMPONENT FEASIBILITY STUDIES

1. Hydrological Assessment

1.1 Study Objectives

The hydrological assessment was carried out with two principle objectives:

- Identify priority catchments for intervention
- Model / predict hydrological outputs under different land-use change scenarios

The study was further designed to generate background information relating to the catchment hydrological regime useful to project implementation.

1.2 Study Findings

1.2.1 Land-use change in the upper-catchment is unlikely to influence catchment water yield in the medium term. SWAT modelling indicates that land-use change to agro-forestry, pasture or crop strips of varying width has little influence over modelled water yield from the Geta sub-catchment over a hypothetical 8 year project life, as indicated in Figure 4.

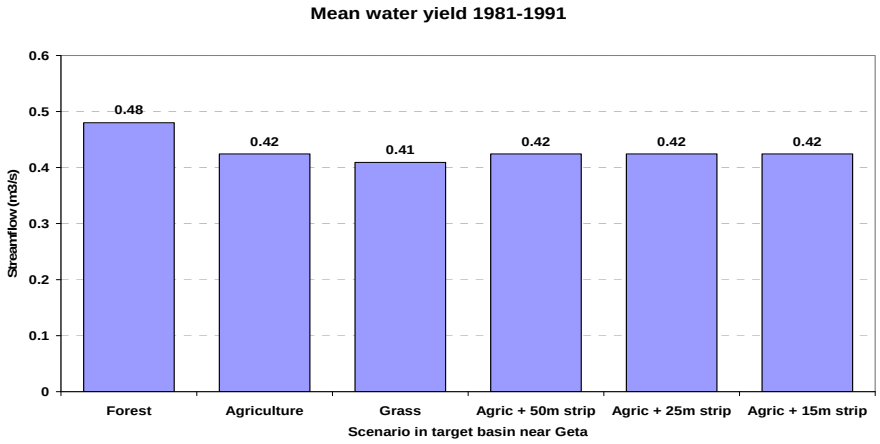


Figure 4: Modelled changes in water yield over project life of 8 years (agriculture represents status quo). Source: Gathenya, 2007

1.2.2 Land-use change in the upper-catchment is likely to influence sediment yield from the upper-catchment. SWAT modelling indicates that land-use change to all of agro-forestry, pasture and crop strips of varying width reduce modelled sediment yield from the Geta sub-catchment over a hypothetical 8 year project life.

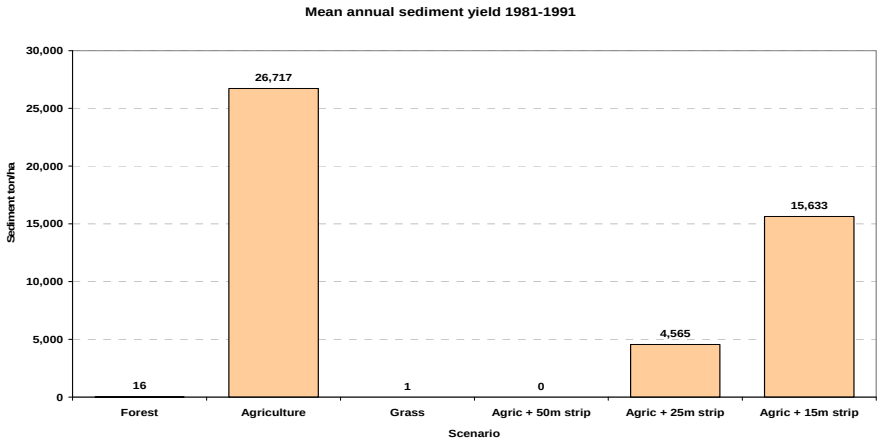


Figure 5: Modelled changes in sediment yield over project life of 8 years (agriculture represents status quo). Source: Gathenya, 2007

1.2.3 The hydrologist used hydrological data to identify target subcatchments where PWS intervention has potential to improve the quality of water flow to Lake Naivasha. Key factors in identifying target sub-cathcments were:

- **Sediment yield:** sub-basins with high sediment yield were identified. If sediment yield from these basins is reduced, the impact on sediment that reaches the lake would be greatest.
- **Pollution threat:** sub-basins with significant sources of pollutants which if reduced, would hypothetically bring about an improvement in lake water quality.
- **Land use/ land cover change:** sub-basins where there has been greatest change in land use; seeing forest replaced by intensive agriculture on steep slopes. Sub-basins where land is being used for the 'wrong' crop and an alternative crop would be better suited and be more environmentally friendly (less chemicals, less water, less erosion, increased infiltration, less labour etc.)

On the basis of these criteria, the hydrologist ranked sub-catchments for priority intervention, which sub-catchments are shown in the land-sat image below.

Rank	Target sub-basin	Sub-catchment	River
1	1	Geta	Wanjohi River
2	3	Geta, Sasini Forest Station	Mkungi River, Sasini Tributary
3	4	Ndunyu Njeru	Kitiri / Rumaru
4	5	Tulaga	Turasha

Table 1: Ranking of sub-catchments for intervention

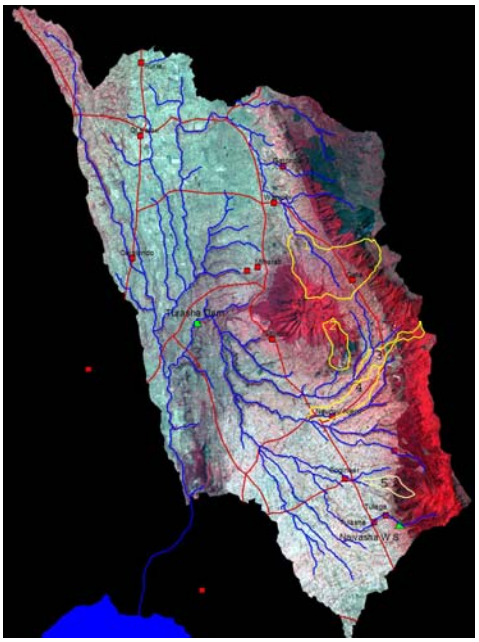


Figure 6: Landsat image identifying target sub catchments

1.3 Weaknesses

There are a number of limitations inherent within the hydrological assessment. These are not the consequence of the quality of research, but are the consequence of a lack of data.

- **Strength of model:** SWAT models can be imperfectly calibrated, particularly in tropical areas and their use is criticised by researchers. This does raise a question over the accuracy of findings.
- **Episodic events:** The model does not account for episodic highly erosive events and it is unknown to what extent such events contribute to downstream environmental problems.
- **Resolution:** Given that certain researchers believe that erosion is a highly localised phenomenon in the Naivasha catchment (limited to the Malewa Gorges and Kipipiri), the sub-basin scale used in the model does not identify hotspots with sufficient resolution.
- **Downstream consequences:** Whilst erosion and associated nutrient input is thought to play a role in lake eutrophication, causation is imperfectly understood. Additionally, nutrients have other sources, such as other areas of the catchment, human settlements around the lake and airborne deposition. It is not known what proportion the various sources contribute to the problem and consequently to what extent upper-catchment land-use change can contribute to problem resolution.
- **Tipping points:** Related to the above, understanding of the lake's equilibrium is poorly understood. Without knowing the stress-load of sediment input, it cannot be quantified to what extent sediment yield from hotspots must be reduced to safeguard lake health.

Recommendations

- PWS intervention can only bring about changes in water quality. As such, the scheme should be "sold" to private sector participants on this basis.
- The type of land-use changes identified by the hydrologist will inform other studies to ascertain what are likely to be the most efficient and equitable.
- If funds can be made available during Phase II, it may be possible to generate a better understanding of catchment hydrology and the lake / catchment relationship, which improvement in scientific understanding would be vital to an efficient scaling-up during Phase III.

2. Malewa Riparian Mapping

2.1 Study Objectives

This study was undertaken following the hydrological assessment in order to enhance its resolution and programme managers' understanding of localised catchment degradation. The study sought to identify lengths of river where riparian condition was likely to be contributing most to the sediment / nutrient problem on the basis of land cover, land use and slope gradient.

2.2 Study Findings

2.2.1 The study has categorised approximately 60km of river according to gradient, landcover, land-use and general condition within the riparian zones of the hydrologist's target sub-catchments.

2.2.2 The study identifies the sub-optimal condition of large parts of the upper-catchment riparian zones and the degree to which such areas are cultivated in contravention of the Agricultural Act which prohibits cultivation within watercourse riparian zones.

5.2.3 The study further identifies where riparian intervention is most urgently required. These stretches fall largely within target sub-catchments 1 and 3.

2.3 Weaknesses

Resources available for the study restricted the riparian mapping exercise to the major tributaries within the target sub-catchments and other locales believed to be in problematic condition. It is as yet unknown whether there may be other problematic stretches of river which have been overlooked.

Recommendations

- The PWS Programme should take a 2 pronged approach, one in which payments are made for land conservation measures on farmland and another for riparian restoration and maintenance given the degraded condition of certain stretches.
- Depending on the scale of available finances, the programme may be able to also focus on degraded riparian areas outside of the principle areas and where there may be significant efficiency gains in so doing.

3. Regulatory and Policy Review

3.1 Study Objectives

The principle purpose of this analysis was to establish whether PES / PWS as conceived by CARE Kenya / WWF EARPO is viable under Kenyan law. A second purpose, in the event the scheme was viable, was to advise on a potential transaction or "deal" structure by which buyers and sellers are engaged.

3.2 Study Findings

3.2.1 Key to project implementation, the study finds that private contracts between watershed service beneficiaries and providers would not be illegal under Kenyan law.

3.2.2 The study also finds that there are mechanisms within Kenyan water and forestry legislation which allow state authorities to collect monies from water users and beneficiaries of forest-related environmental services for water resource and forest protection respectively. Whilst under consideration, such mechanisms have not yet been put in place in the Naivasha catchment.

3.2.3 The Water Act establishes the possibility for communities to establish "Water Resource User Associations" (WRUAs) which will function to manage local water resources, impose charges for water use and manage levies charged for water use to secure improvements in water resource improvements. WRUAs in Naivasha have been formed which sets in place a financial structure for channelling payments through the PWS scheme.

3.2.4 The potential exists for levies on water abstraction to be directed into a PWS scheme.

3.2.5 There are a number of intermediary structures open to the scheme, as illustrated in Figure 3. The study concludes that a company acting as agent or trust is likely to be the most efficient and acceptable intermediary mechanism.

3.2.5 Following the conclusions of the hydrological assessment and identification of watershed service beneficiaries, the following "base" structure is specified, which could be adapted following the findings of other reports.

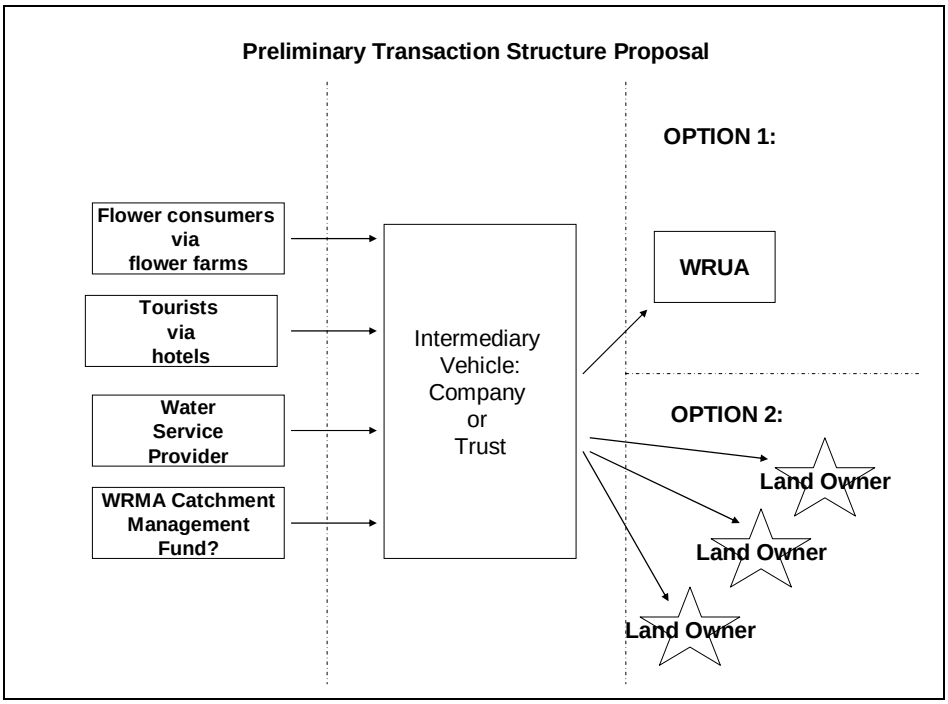


Figure 7: Proposed Transaction Structure

3.3 Weaknesses

3.3.1 The belief is commonly held amongst policy-makers that a privately orchestrated PWS programme should be endorsed by state actors. Whilst on a *prima facie* reading of Kenyan law, such a view is incorrect, if the scheme fails to be endorsed, problems may be posed in contracting with WRUAs for provision of watershed services.

3.3.2 Using WRUAs as a means for incentivising improved land management may be less efficient than payments to land-owners directly. Where land-owners undertake land-improvement measures, but are not fully compensated for costs associated with such improvements, then the incentive to undertake such measures is diminished.

Recommendations

- That with capitalisation of the programme by private investors, the PWS Programme is not impeded in law from roll-out.
- Endorsement should be sought from state actors for the Programme, which will make negotiation with WRUAs less problematic.
- Kenyan water sector policy is firmly focused on implementation of WRUAs at a community level. The PWS Programme should seek to enhance such community participation in watershed management by using WRUAs to secure land-use change (Option 1 above).
- Payments (cash or kind) should also be made to individual land-owners (Option 2 above) so that individual incentives for improving conservation measures are not diluted.

4. Sellers' Costs Analysis

4.1 Study Objectives

The primary objective of the Sellers' Costs Analysis was to establish the likely costs of PWS implementation under different land-use intervention scenarios to buyers of watershed services and thereby inform the programme cost benefit analysis. An ancillary objective was to evaluate the likely flow of benefits to upstream programme participants above and beyond any compensation which might be given.

4.2 Study Findings

4.2.1 The study specifies "one-off" implementation costs and opportunity costs, which are recurring over project life.

Land-use change scenario	Implementation Costs / ha farmland (USD)	Opportunity costs / ha farmland (USD)
10m grass strips	134	71
25m grass strips	336	178
100% pasture	3555	711
100% agroforestry	5164	711

Table 2: PWS implementation costs per hectare of farmland

4.2.2 The study further projects on-farm net benefits (other than potential compensation) to land-owners which might arise from land-use change. On farm private net benefits are estimated at approximately USD 960 / yr / ha. The significant likely on-farm net benefits of PWS implementation, in essence externalities to the PWS contracts, are important within the context of Kenyan government policy to increase agricultural efficiency. Further, they are a good indication as to the equitability of the scheme, which is capable of delivering significant benefits other than PWS compensation.

4.2.3 The study also frames the general economy of the upper-catchment providing clear insights into potential negative effects of land-use change which takes land out of productive use, in particular the effect that such a programme may have on agriculture support businesses such as fertiliser sellers. Further, the study identifies that a significant minority (41%) of upper-catchment farmers would be unwilling to participate in the Programme, as owing to extremely small land holdings would not be able to meet subsistence needs if land is set aside for conservation purposes.

4.3 Weaknesses

4.3.1 The consultants undertook a "Willingness to Accept" survey, which was flawed and has produced flawed results disproportionate to the compensation variation as is otherwise

uncovered by the implementation and opportunity costs. The results of this survey would have proved very useful in ascertaining likely project costs. However, implementation and opportunity costs are instead used to estimate likely programme costs.

4.3.2 Upstream cost and benefits are catchment wide and do not account for the likelihood of variations in costs between sub-catchments.

4.3.3 10m cost strips did not form part of the hydrologist's modelling exercise – which used 15m strips in the modelling exercise - and as such, there is a disconnect between the two pieces of analysis. CBA models can be adopted to cater for the difference. However, as preliminary advice sort in relation to crop-stripping indicates that 10m strips would provide much the same effect as 15m strips, the emphasis remains on 10m strips as the most cost-effective solution.

Recommendations

- Land should not be taken out of productive use.
- See recommendations under Section 5 (Cost Benefit Analysis) of which this study is a constituent part.

5. Programme Cost Benefit Analysis (CBA)

5.1 Study Objectives

The primary purpose of the CBA is to assess whether the programme will deliver net benefits to buyers. A secondary purpose is to consider the relative costs (and thereby benefit cost ratios) of different Phase II scenarios.

5.2 Study Findings

5.2.1 On the basis of the preliminary stakeholder / beneficiary analysis, the CBA gives standing to three classes of buyer: flower consumers via flower farms, tourists via hotels and the Gilgil / Nakuru Water Service Provider, for whom water quality is an issue and for whom benefits are estimated.

5.2.2 The programme has the potential to deliver net benefits depending on the land-use change and sub-catchment in which Phase II is trialled, as indicated below. The Benefit Cost Ratio (BCR) indicates the scale of return on private investment in the PWS scheme.

Scenario	Intervention	BCR	Feasibility	Present Value of PI and PII Costs (USD '000,000)
1	**10 m crop strips**	5.14	☑	2.08
	25 m crop strips	2.06	☑	5.2
	Pasture (100%)	0.36	☒	29.7
	Agroforestry (100%)	0.30	☒	36.2
2	**10 m crop strips**	7.19	☑	1.5
	25 m crop strips	2.87	☑	3.7
	Pasture (100%)	0.47	☒	22.6
	Agroforestry (100%)	0.38	☒	28.3

3	**10 m crop strips**	5.59	☑	1.9
	25 m crop strips	2.24	☑	4.8
	Pasture (100%)	0.39	☒	27.7
	Agroforestry (100%)	0.31	☒	34
4	**Grass Strips in Riparian degradation hotspots**	40.38	☑	1.6
5	**Grass strips in Greater Malewa Riparian**	0.94	☒	11.3

Table 3: Benefit Cost Ratio, option feasibility and cost

5.2.3 10m crop strips are the cheapest land use intervention and, if employed in the Mkungi / Sasini sub-basin during Phase I scaling up to other priority sub-basins during Phase III, is the most cost-effective delivering the highest return on investment.

5.2.4 Costs of riparian restoration are estimated. If riparian restoration is successful in itself in providing downstream benefits, then this represents the most cost-effective solution. If such intervention took place along all watercourses in Greater Malewa (the upper-catchment), it is interesting to note that benefits are only slightly lower than costs.

5.2.5 Sensitivity analysis indicates that where benefits are significantly lower, USD 2.96 million (Net Present Value over hypothetical 8 year project life) then the Programme is still viable but only if employing 10m crop strips. The sensitivity analysis is useful in predicting how much may be available to the Programme from private sources, in the worst case scenario, USD 2.96 million over 8 years.

5.2.6 If donors contribute a component of start-up costs to the project, then the potential buyers' benefit cost ratio improves.

5.3 Weaknesses

5.3.1 The link between upstream land-use change and crystallisation of downstream benefits is unclear. The cost benefit analysis is premised on a causal link between the two, which as noted in section 4.3 remains uncertain.

5.3.2 There are a large number of different potential Phase II and III scenarios over which costs can be estimated. The CBA only provides a snapshot of the most likely.

Recommendations

- The CBA, weak assumptions aside, provides necessary financial justification for Programme implementation.
- Given the exploratory nature of Phase I, it is prudent to take the least cost approach, which would see Phase I rolled-out in the Mkungi – Sasini sub-basin utilising 10m grass crop stripping methodology.
- Preliminary estimates cost the Phase II trial and Phase III roll-out within other sub-basins utilising 10m crop strips at USD 2.08 million, with a present value of USD 1.49 million over 8 years.
- Given the relatively low cost of riparian zone restoration, this could (subject to administrative

constraints) be trialled in all three priority sub-catchments.

6. Livelihoods Analysis

6.1 Study Objectives

The aim of the Livelihoods Analysis was to establish a broad poverty baseline, identify livelihood dimensions which may impact design of scheme and informally gauge willingness on the part of sellers to participate in the scheme.

6.2 Study Findings

6.2.1 The study has generated useful baseline data, particularly with reference to necessary services which are undersupplied in the catchment, such as health services. Such information is useful in designing potential payment / compensation mechanisms, although receipt of compensation should ultimately be decided within the communities themselves.

6.2.2 Rented land is not as prevalent as indicated in a preliminary livelihoods study, amounting to only 4% of land in study areas. This was initially a concern as land is typically rented by poorer households, whose access to land could have been curtailed where land zoned for conservation was removed from productive use. This concern subsequently falls away.

6.2.3 Whilst men typically own land, women are dependent on land for income. Partially removing land from productive use may negatively impact upon women's income, particularly if compensation under the scheme is given to land-owners.

6.2.4 Community focus groups displayed an interest in the scheme, expressing a preference for payments directly to land-owners rather than into a community fund.

6.2.5 The study ranks sub-catchments according to prevalence of poverty, size of land-holdings and perceived enthusiasm of communities to participate.

Sub-catchment	Gatamaiyu	Tulaga	Ndunyu Njeru	Geta
Rank Prevalence of Poverty	2	1	4	3
Rank Size of Landholdings	1	2	3	4
Rank Willingness to Participate	4	3	2	1

Table 4: Livelihoods ranking of sub-catchments

Recommendations

- From a livelihoods perspective, there is justification for PWS, although the study urges careful programme design.
- Land should not be taken out of productive use.
- Recipients of payments should take a lead in specifying types of compensation.
- Cognisance must be given to the potential for the scheme, in rewarding land-owners (men) to have a potentially harmful impact on women. In designing the compensation mechanism it may be necessary for a component of the payments to be provided in the form of services which women are likely to use.

7. Local Level Legal Analysis

7.1 Study Objectives

This study was generally concerned with identifying land tenure regimes within the target areas. Specifically, consultants were tasked with establishing whether property rights / norms are sufficiently clear for a market-based conservation mechanism to be implemented and how modes of livelihood around property rights might influence Programme outcomes.

7.2 Study Findings

7.2.1 Land in the study area is principally privately held, although small tracts of communally held land exist as public areas within settlements. Forested land is state owned, although usufruct pertaining to such land is likely to be given to Community Forest Associations following implementation of the Forestry Act 2005.

7.2.2 Only about 60% of the current households have title deeds for their land, however land disputes are not commonplace as title deeds exist for most land but have not been formally transferred to the current owners.

7.2.3 Illegal cultivation takes place on government land especially in the forests.

7.2.4 That resource control / ownership at household level, especially of land, is predominantly male while women only have access to resources.

7.2.5 Traditional / local by-laws and customary norms that may once have existed to govern ownership and transfer of land access no longer exist.

7.2.6 The study ranks the various sub-catchments according to clarity of land rights – principally the existence of current title deeds:

Sub-catchment	Gatamaiyu	Tulaga	Ndunyu Njeru	Geta
Rank Clarity of Property Rights	4	**3**	1	2

Table 5: Local level legal assessment ranking of sub-catchments

Recommendations

- Care must be taken in designing the payment mechanism to avoid restricting access to land

by women or ensuring that benefits associated with such land do not flow to men only.

8. Environmental Screening Exercise

8.1 Study Objectives

The purpose of the Environmental Screening Exercise was principally to ascertain whether there may be any adverse environmental impacts associated with implementation of the PWS Programme.

8.2 Study Findings

The study took a sectoral approach and found that there were no adverse environmental impacts associated with the Programme. On the contrary, the Programme offers gains in niche habitat and corridor formation, deemed important in an area of high biodiversity.

7.3 Weaknesses

The sectoral approach taken by the study, as opposed to a conventional approach looking at impacts on fauna, flora, soil, air and water has meant that the likely social dimensions of the Programme are examined in greater detail.

Recommendations

- The study views the Programme as likely to have a positive influence on environmental quality in target sub-catchments.

8. Conclusions

The various components of the feasibility study serve a dual purpose:

- to answer key questions determining project feasibility (set out in Table 5), and
- to guide programme design, to which greater attention is given in Part IV.

Key Questions	Answer	Comments
9. Can land-use change upstream improve downstream watershed service provision?	Unproven	Hydrological model shows land-use change can reduce sediment yield at the sub-basin level. The impacts of this downstream remain to be proven during Phase II.
10. Would improved watershed service provision provide economic benefits to downstream watershed service beneficiaries?	Yes	The benefits appraisal component of the CBA suggests this to be the case.
11. Are there potential buyers of watershed services?	Yes	Yes, following the conclusions of the benefits appraisal component of the CBA.
12. Are there willing sellers of watershed services?	Yes	Yes, as indicated by informal gauging during the Livelihoods Assessment.
13. Would payments for watershed services	Yes	See Policy & Regulatory Study.

be legal in Kenya?		
14. Are the livelihood consequence of a payments for watershed services programme likely to beneficial to upstream communities?	Unproven	Upstream Sellers' Costs Analysis suggests there are significant on-farm benefits to PWS participation. The Livelihoods Assessment indicates that gender differentiated control of farm resources must be accounted for in mechanism design.
15. Are property rights in upstream areas sufficiently clear for payments (in cash or kind) to be made and for contingency to be secured?	Yes	See Local Level Legal Analysis.
16. Are downstream environmental benefits and increases in on-farm productivity mutually exclusive?	Unproven	Upstream Sellers' Costs Analysis suggests that long-term benefits exist, but a question remains as to whether the programme can be designed to fit with increased short term productivity increases.

Table 6: Key questions and answers

The extent that the questions are answered broadly in the affirmative provide justification for Phase II implementation of the PWS Programme. That 3 of the key questions remain unproven does not render the Programme unfeasible, but specifies the need for programme managers to place emphasis in catering to concerns about viability of certain components of the Phase II Trial roll-out.

PART IV: PROGRAMME DESIGN

1. Purpose

The purpose of this Part IV is to draw together the key recommendations of the component feasibility studies in order to inform Phase II project design and thereafter implementation. The approach taken is to use recommendations made in the Regulatory and Policy Study regarding transaction structure and add to this, developing its sophistication in reflecting the recommendations of the various Phase I studies.

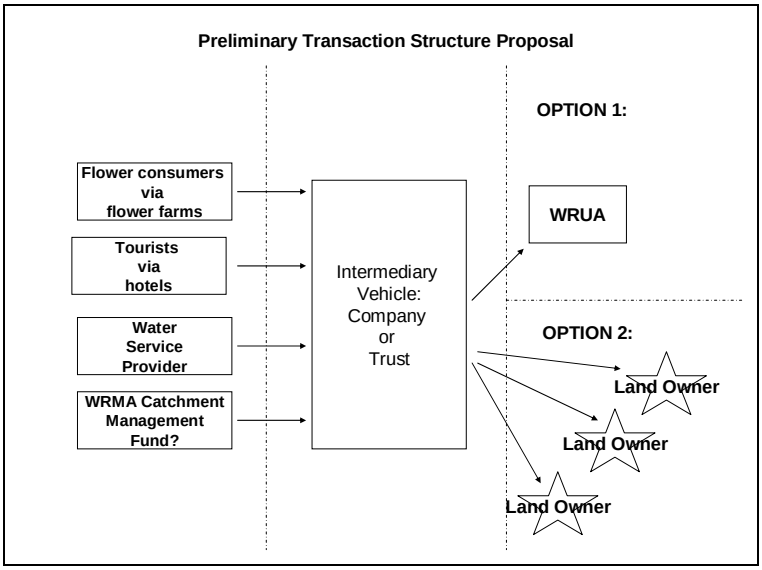


Figure 8: Proposed Transaction Structure

2. Implications of Hydrological Assessment & Riparian Mapping for Programme Design

2.1 A key question raised by the Hydrological Assessment is whether the PWS programme is capable of transferring sub-basin improvements in water quality to the catchment level. The background to the NR problems facing Lake Naivasha identifies several other sources of nutrient input, which include settlements around the lake and airborne deposition. There are plans (Harper & Mavuti, 2004) to rehabilitate the North Swamp at the mouth of the Malewa and papyrus stands around the lake's riparian zone with the intention of restoring the lake riparian zone's sediment and nutrient function.

If such programmes were to be successful (which is unproven), they would deliver ecological goods and services to the users of lake water more efficiently than the traditional upstream / downstream PWS Programme. A similar consideration arises from the Malewa Riparian Mapping Exercise. There is an inherent tension between efficiency and equitability within a PES programme which seeks equitable outcomes, which programme managers must try and reconcile. In so doing, CARE Kenya is currently exploring the potential for rehabilitation of the lake riparian zone to be incorporated within the PWS programme on equitable PES terms.

The conservation related seasonal moratorium on lake fishing puts fisherman out of work for three months a year, and it has been suggested that such fishermen could undertake restoration and monitoring of papyrus stands on PES terms.

Once levels of available private sector funds are established, other means of securing the improvements in ecological service provision must be incorporated in order to enhance the likelihood of such improvements and the level of "value for money" necessary to maintain payments from potential buyers.

2.2 The Hydrological Assessment creates a case for use of agroforestry plantations, conversion to pasture or crop stripping for catchment conservation (a point further developed in the CBA), however no expert input has yet been given to the programme regarding best-practice within the Malewa catchment. A provision must be made for further consultation with a soil conservation expert prior to the initiation of Phase II in earnest.

3. Implications of the Livelihood Assessment

3.1 The livelihoods assessment cautions against payment mechanisms which may damage women's incomes from agriculture. However the study also states the need that communities be consulted with regards to payment design. This creates the need for community consultation once the Phase II trial sub-catchment has been identified. CARE Kenya have produced a paper outlining different payment mechanisms used in PES schemes globally which can be used to inform the approach, which specifies that a link must be maintained between the land-owner / user undertaking land conservation measures and receipt of benefits. Where benefits are dispersed across a community for work undertaken by one member, then the power of the incentive payments which underlie the programme are weakened. In order to maintain this link, yet ensure that women's income is not undermined by the scheme, it may be necessary to encourage communities to use a voucher scheme for medicine, health consultations or school fees given that this is where women's income is spent. However, the final say should lie with communities in defining how compensation or benefits are received.

3.2 The Livelihoods Study, like the Upstream Sellers' Cost Analysis, stresses the importance in not removing land from productive use. This is potentially problematic given the theoretical assumption that PES and increased productivity are mutually exclusive (Zilberman, 2005). However, CARE Kenya are currently exploring the potential for a VegCARE type intermediary, which aggregates smallholder supply for the domestic and export markets, to expand its activities within the Phase II trial sub-catchment. VegCARE type intermediaries are able to offer both:

- forward contracts providing certain markets, and
- improved produce prices; by offering a direct gateway to markets.

It is recommended that the potential for such a scheme be established in the Phase II trial sub-catchment and that payments under the scheme be pegged to farmgate payments. If this can be achieved the supposed link between productivity and negative environmental externalities is partially broken, as whilst unit productivity may decrease, sellers' on-farm incomes should increase. Additionally, there is a fear that the PWS Programme could create perverse incentives for farmers outside of the project area to consciously degrade their land. By linking PWS to participation in marketing schemes such as VegCARE, this perverse incentive will not be as strong.

4. Implications of the Local Level Legal Assessment

The local level legal assessment draws attention to the lack of current title deeds held by land-owners in the upper-catchment. Whilst deeds were issued following independence, such deeds have not always been formally transferred from one generation to the next. Whilst PES schemes have in certain circumstances created an ancillary benefit through increased land tenure security, such a process could be fraught for an NGO trying to assist in the process, given the potential to be caught in land disputes. Nevertheless, consideration should be given to assistance of registration of such land, should communities so desire.

5. Implications of Upstream Sellers' Cost Analysis

5.1 The Seller's Costs Analysis provides further warning against taking land out of productive use, owing to potential impacts on the local agricultural services economy. A VegCARE type intermediary would lessen such impacts, and under such a scenario, participating farmers would experience the following costs and benefits associated with the scheme.

Costs	Benefits
Costs of land conversion (implementation costs)	PWS Compensation / Payment
Opportunity Costs	VegCare Premium?
	Profits associated with alternative land use

Table 7: Seller Costs and Benefits of PWS

5.2 The Sellers' Costs Analysis provides guidance towards the level of payment to be made under the scheme. In an optimum scenario, as illustrated in Figure 9, sellers receive:

- PWS payment equivalent to implementation costs and opportunity costs.
- negotiated profit
- VegCARE premium
- Profits Associated with alternative land-use (pasture in the case of grass strips)
- Value of the benefits of on-farm conservation – ie increased future productivity

In the worst case scenario, the PWS payment is calculated by reference to other benefits which the sellers will gain as a result of participation in the scheme, such that the PWS Buyer only pays the difference between costs and benefits to the Seller. In this situation, there is no equitable premium.

Also presented below is a possible compromise, “the workable (?) scenario”, in which there is an equitable premium created under the programme, but under which the seller receives a payment which takes into the account certain of the programme benefits.

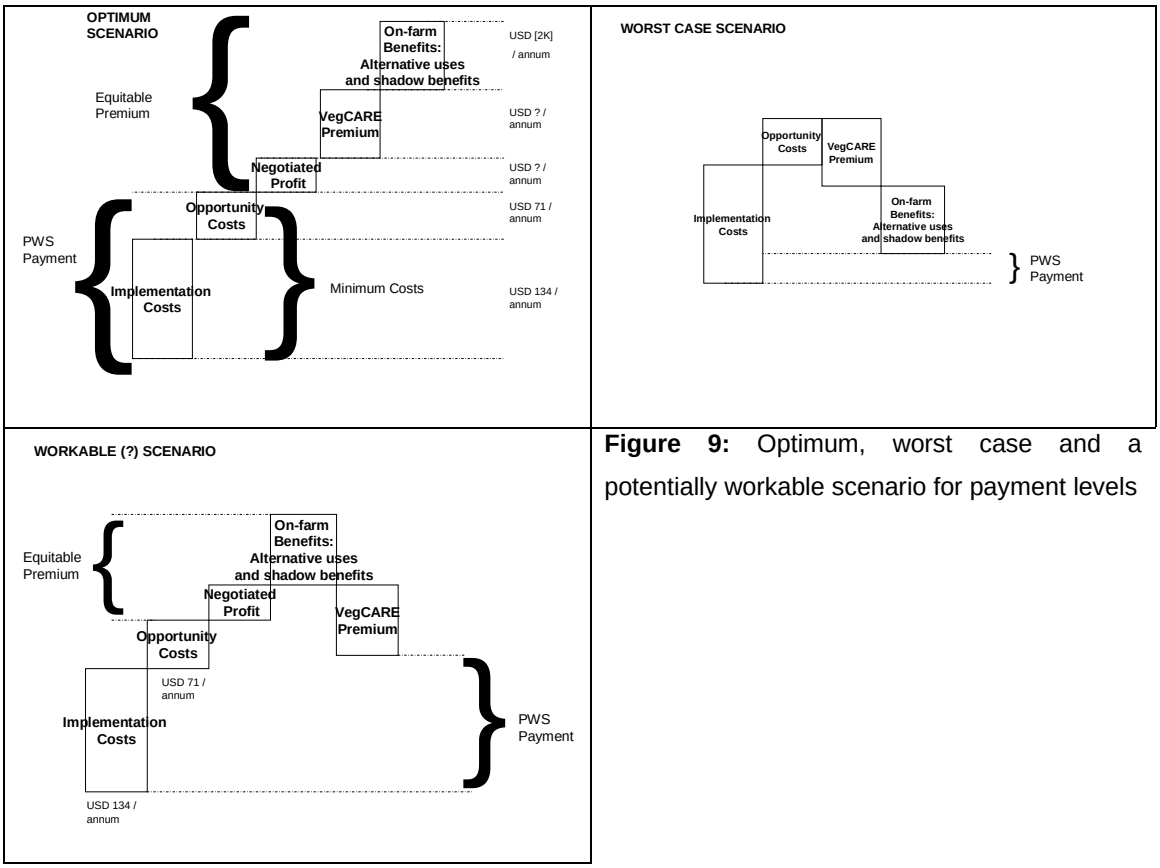


Figure 9: Optimum, worst case and a potentially workable scenario for payment levels

The precise payment level, and its components, cannot be decided until buyers have committed funds to the project. However, the above serves as a conceptual model for deciding at what level to pay.

6. Implications of the Cost Benefit Analysis

The CBA creates a strong argument for the Phase II trial to take place in the Mkungi / Sasini sub-basin before scaling up to other priority sub-catchments. The Hydrological Assessment and Livelihoods Assessment both prioritise the Geta / Wanjohi sub-catchment ahead of the Mkungi / Sasini sub-basin. However, given the experimental nature of the programme, it is likely that costs analysis should take precedence.

Costs analysis also emphasises the cost effectiveness in riparian restoration in the upper-catchment. This presents an opportunity to engage the WRUA, as recommended under the Legal & Regulatory Study.

7. Conclusions as to Overall Structure

Developing the structure following the preceding analysis leads to a final transaction structure proposal as presented below. Further detail will be added to the trial structure once certain activities, specified in Section 8 are completed.

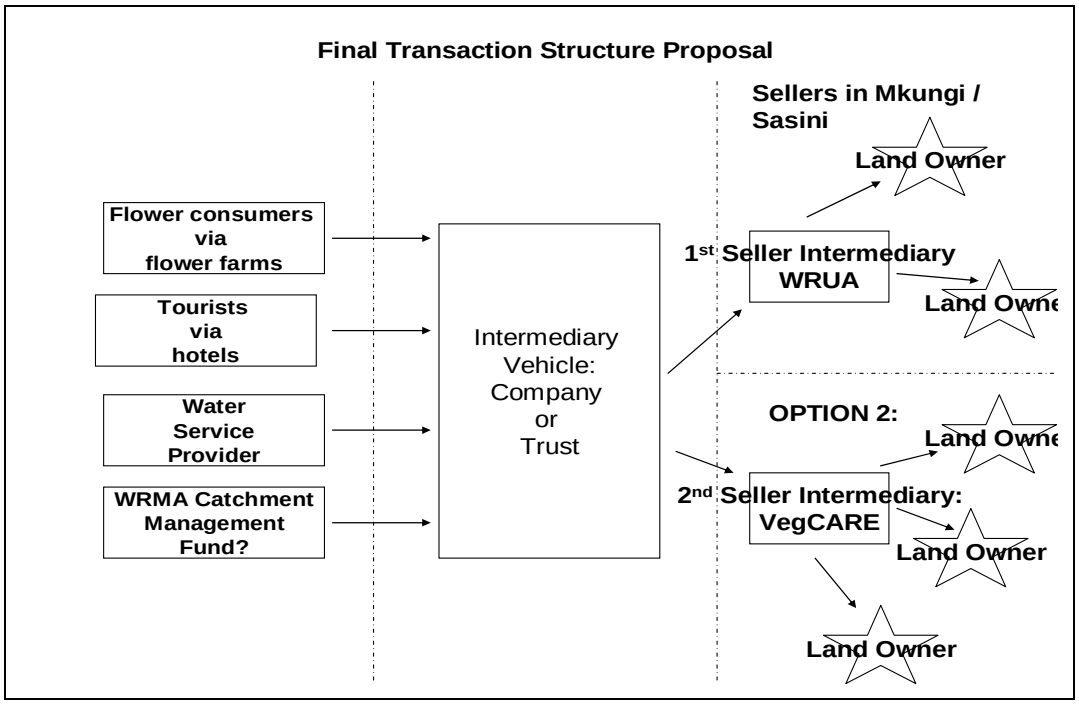


Figure 10: Clarification of Structure

17. Further Activities

Figure 10 offers a clarification of the likely project structure. There still remain certain activities which will strengthen this conceptualisation, but which remain uncertain pending their outcome. Such activities are considered as "Bridging Activities" and are required before formal project inception in January 2008.

- Decision re. Phase II trial sub-catchment
- Specification of on-farm conservation activities
- Specification of River Riparian Zone rehabilitation activities
- Specification of Lake Riparian Zone rehabilitation activities which would require partnership with University of Leicester / Earthwatch
- Identification of land-owners / plot boundaries
- Recosting intervention plans
- Seller Workshop to Discuss PWS Payment Compensation structure
- Workshop with Buyers to decide on transaction structure
- Consultation with Lake Stakeholders re rehabilitation of lake riparian zone, in particular fisheries communities

- Establish how M&E Plan will interlink with VegCARE M&E Plan
- Prepare shortlist of potential Intermediary Group members
- Establish Intermediary Group

18. Buy Side Structures

There remains some uncertainty as to the buy side structures, which depend on negotiations with Buyers. A preliminary indication of the likely buy-side structure and its interactions with the sell-side are set out in Figure 11.

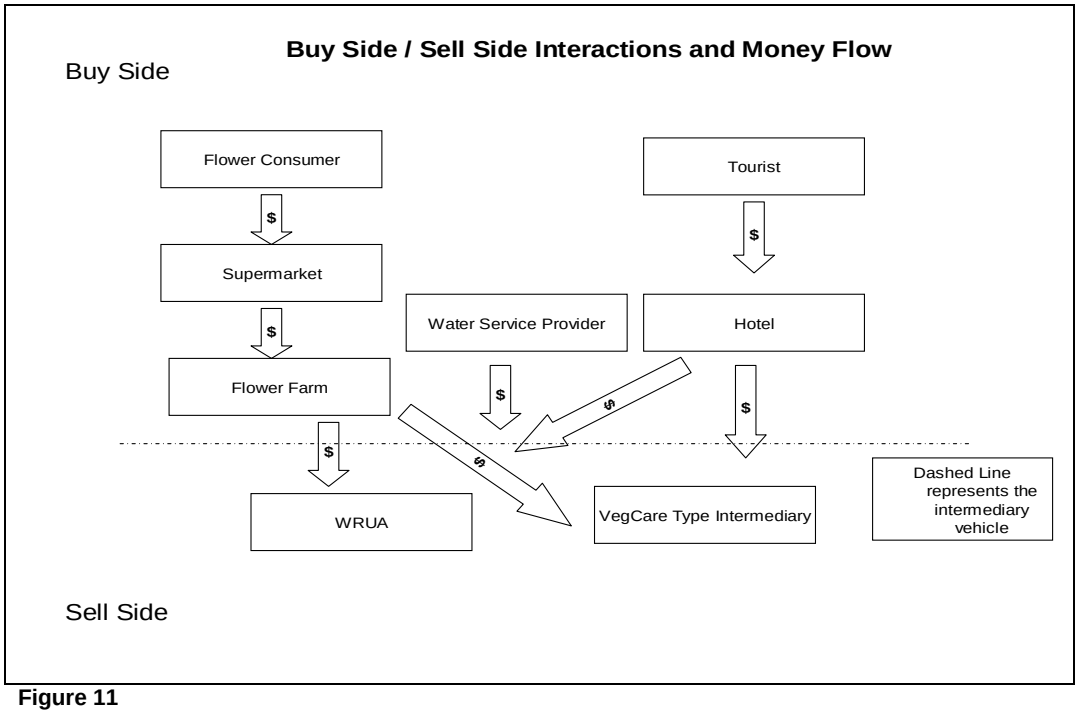


Figure 11

Annex 1: Lake Naivasha / Malewa Catchment Payments for Environmental Services Project / Payments for Watershed Services ("PES / PWS") Programme

The Phase I Malewa Catchment PES Feasibility Project undertaken between January and June / July 2007 ends formally on September 30 2007. Phase II begins formally on 1 January 2008 and is contingent upon signing of MoUs between Environmental / Watershed Service ("ES / WS") providers and ES / WS buyers which state an intent to enter to trial the PES / PWS concept. Phase II is scheduled to last four years, beginning 1 January 2008. The first 6 months will be organised to implement preparatory activities, the following 3 years will be devoted to execution of land-use change according to the business case.

Phase II activities, as well as the bridging activities between September 2007 and January 2008 must be planned according to the nature scope, structure and location of Phase II activities.

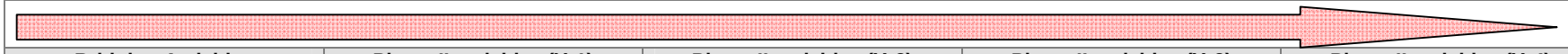
Country Office: Kenya			
Project Title: Lake Naivasha & Malewa Catchment Payments for Environmental Services (PES) Project			
Narrative Summary	**Expected Results**	**Performance Measurement**	**Important Risks and Assumptions**
Project Goal To improve the livelihoods of 4,000 households in the Naivasha Catchment through: • creation of a trial market for watershed services ("WS"), and • providing access to markets for carbon sequestration / offsets ("CS").	**Impact** • Enhanced Environmental Quality • Improved Livelihood Security for Target Population.	**Performance Indicators** • Improved water quality in the catchment's rivers (WS) • Improved land conservation measures • Measurable increase in benefits (cash or kind) received by upper-catchment land-owners and communities	Contingent upon Buyer and Seller signing of MoUs.
Project Purpose • Improved natural resource management within PES trial areas within the Naivasha catchment • Providing measurable improvements to livelihoods within trial areas • Providing a trial for PES which can be scaled to cover further areas within the watershed / other watersheds if successful	**Outcomes** • Identification of land-use change which achieves optimal on-site and off-site benefits • Implementation of PES payment mechanisms as recommended by feasibility study • Organisations involved in PWS trial strengthened in terms of governance, negotiation, conflict resolution and NRM • Further develop methodologies for facilitating and monitoring equitable	**Performance Indicators** • Improved sub-catchment hydrological indicators. • Improved on-farm income. • Improved household income	Catchment / Lake relationship linear

	PES initiatives, for involving rural communities in both WS and carbon markets.		
Activities	**Outputs**	**Performance Indicators**	**Important Risks and Assumptions**
1. Trial area hydrological baseline studies First year hydrological study to create establish baseline data in target sub-catchment where there current data paucity	▪ Methodology for generation of baseline data ▪ Hydrological report summarising and analysing baseline data	Receipt of local baseline study.	
2. Creation of local hydrological monitoring networks in target sub-catchments Data paucity in target sub-catchments	▪ Plan outlining how cost-effective monitoring network can be established ▪ Daily / weekly hydrological "Flash" reports in electronic / spreadsheet format	▪ Contracts for monitoring staff. ▪ Receipt of Daily / weekly hydrological Flash Reports	
3. Land-use change study Following specification of optimal land-use changes in Phase I hydrological study (SWAT analysis), facilitate better understanding of optimal land-use change.	Land-Use change Study, identifying at a local scale the optimal land use changes which should take place	Receipt of actionable Land Use Change survey	
4. Full Carbon offsets / sequestration analysis Following execution of MoU between retailer / end buyer and communities, initiate market engagement through: 1. full analysis **ii.** facilitation of contractual engagement with Kenyan Forestry Service for PFM "forest management contracts".	▪ Full plan for sale of carbon offsets and sequestration. ▪ Forward contracts / options for sale of credits.	▪ Completion of forward contracts / options agreements. ▪ Receipt of monies into Community Carbon Accounts	
5. Creation of PES Mechanism **i.** Establish legal entities and composition thereof necessary to disburse PES payments: • "Lake & Catchment Protection Fund" • Community Carbon Offset Funds	**i**. Legal documentation for and registration of Funds and charity. ii. Signed agreement as to nature of disbursements. iii. Agreements re control of Funds' accounts.	▪ Receipt of certification of creation of Funds and charity. ▪ Finalisation of legal documentation.	

• Charity to hold ecolabel licence. **ii.** Facilitate negotiation of payment mod e (cash or kind; if kind, nature of disbursement). **iii.** Establish accounts and payment mechanisms to effect disbursement of monies paid under the scheme: • transparent community accounts where monies paid to communities • individual accounts where payments to individuals (M-PES). **iii.** Formalise the nature of the relationships between the various entities engaged in the PES programme: contracts for the carbon market **iv.** Facilitate buyer / seller negotiations. Assist sellers in price-setting	▪ iv. Creation of PES accounts: Funds and payment recipients. ▪ v. Contracts re Funds, collection and disbursement of monies. ▪ vi. Price setting report.		
6. Lower-catchment PES Mechanisms Further investigate and facilitate incorporation of lower catchment target "sellers" into PES mechanism, for example out-of-season fishermen for rehabilitation and maintenance of papyrus and fever tree acacia stands in the lake's riparian zone.	▪ Lower catchment "Seller" institutional analysis. ▪ Capacity assessment of lower catchment institutions. ▪ Riparian zone management plan.	Initiation of payment to downstream users.	
7. Establish Extension / Monitoring Service **i.** Facilitate creation of: • extension scheme, and • land-use change monitoring network. **ii.** Identify criteria under which payments triggered. **iii.** Training of extension officers / monitoring staff.	▪ Extension scheme service plan ▪ Employment contracts for extension staff ▪ Extension staff training programme	Land use change	
8. Institutional Development **i. Seller Support** • Facilitate capacity building in the	• Training workshops for administrative staff within WRUA • Registration of WRUA where		

nascent Wanjohi Water Resource Users Association • Facilitate creation of Water Resource Users Associations in accordance with Water Act 2002 in other target sub-catchments.	unregistered.		
9. Phase II reviews **i.** Bi-annual progress reviews identifying obstacles to further progress. **ii**. Facilitate negotiations where required to ensure conflict-free progress **iii.** Annual audit of Fund accounts	Biannual progress reports and audits	Receipt of reports / audits.	
10. Phase III Contractual Coordination Facilitate creation / drafting of binding contracts (and the most appropriate form therefore) for Phase III.	Draft and finalised contracts	Receipt of copy contracts.	
11. Methodology Development **i.** Identify and develop relevant tools and methodologies, pre-test and evaluate **ii.** Develop and disseminate guides and training materials to support the use of new / adapted methodologies and tools	Reports / IEC materials		

Annex 1A
PWS Key Activity Chronology

2007	2008	2009	2010	2011
				
Bridging Activities	**Phase II activities (Yr1)**	**Phase II activities (Yr2)**	**Phase II activities (Yr3)**	**Phase II activities (Yr4)**
Establish Intermediary Group	Ensure capitalisation of Fund	Ensure capitalisation of Fund	Ensure capitalisation of Fund	Ensure capitalisation of Fund
Initiate baseline empirical hydrological study in sub-catchment	Coordination monitoring / extension / payments	Coordination monitoring / extension / payments	Coordination monitoring / extension / payments	Coordination monitoring / extension / payments
Initiate creation of monitoring network	Audit of Fund accounts	Audit of Fund accounts	Audit of Fund accounts	Audit of Fund accounts
Carry out land-use change study: i. on farm conservation methods, ii. river riparian rehabilitation measures, and iii. lake riparian measures.				Post – ante livelihoods study
Identify plots / owners of land				**Phase III Contractual Coordination** Facilitate creation / drafting of binding contracts (and the most appropriate form therefore) for Phase III.
Discussions / negotiations with Buyers re sell-side structure				
Discussions / negotiations with Sellers re payments / compensation mechanism / form				
Establish legal entities necessary to PWS / PES Implementation: i. [Lake / Catchment Protection Fund] ii. [Entity holding ecolabel licence]				
Side-by-side creation of VegCARE entity				

WRUA capacity building				
Finalise creation of extension / monitoring network				
Initiate environmental extension service (in collaboration with VegCARE agricultural extension service).				