Journal of Climate Change, Vol. 1, No. 1-2 (2015), pp. 119–128.
DOI 10.3233/JCC-150010

Payment of Ecosystem Service to Alleviate Poverty from Kyrgyz Republic in Central Asia Considering Climate Change and Extreme Weather Condition

Chitresh Saraswat[1], Pankaj Kumar[1,2*], Dinara Kem[3], Ram Avtar[1] and AL. Ramanathan[2]

[1]United Nations University, Institute for the Advanced Study of Sustainability (UNUIAS)
5-53-70, Shibuya-ku, Tokyo 150-8925, Japan
[2]School of Environmental Science, Jawaharlal Nehru University, New Delhi - 110067, India
[3]Kyrgyz National University, 547 Frunze Street, Bishkek 720033, Kyrgyzstan
✉ pankajenvsci@gmail.com

Received June 5, 2015; revised and accepted August 3, 2015

Abstract: The major focus of payment of ecosystem services (PES) approach is that those who provide environmental services should be compensated for doing so and that those who receive the services should pay for their provision. This work tried to explore the potential of payment of ecosystem services under water related ecosystem service in the Krygyz Republic in central Asia to reduce poverty. Also it focussed on the kind of payment method which can be used for implementing PES. A very important aspect is to explore the policy research interface to make it a powerful tool. The site identified based on the pilot project by CAREC can be used as the building block to design further PES scheme in Krygyz Republic. The first and important finding in the report is that PES can become a helping hand to reduce poverty from Kyrgyz Republic with a mode of generating an extra income for poor but we cannot say it is very effective and completely capable of eradication of poverty from the country. The key findings are most dependent on the factors like interest among stakeholders for new tools to address water resource management, a very strong local organization which can do the mediation in implementing the site projects, broker the agreement between sellers and buyers and monitoring the project in further stage and various tensions between downstream and upstream water users. The local governing body needs to set up an institution established to bring together ecosystem service buyers and sellers (KAESBS – Krygyz association of ES buyer and seller). The important step is to design the mechanism so as not to exclude poor land users by keeping transaction costs as low as possible, and being creative in responses and strong local organizations such as community groups or NGOs participation plays a great role in designing and negotiation process.

Keywords: Payment of ecosystem service (PES); Kyrgyz republic; Water resource management; Poverty.

Introduction

Theory of Payment of Ecosystem Services

The major focus and the core theory of PES approach are that those who provide environmental services should be compensated for doing so and that those who receive the services should pay for their provision (Pagiola and Platais, 2003). Payment of ecosystem services programme can be an effective tool in order to capture the benefits derived from environmental services and make payment for those people who are responsible to maintain natural resources and these

*Corresponding Author

ecosystem services. This is the way of providing them the incentives to conserve and value it more from the people who are getting benefits from them. Sven Wunder (2005) defines PES as having five attributes as a voluntary transaction where a well defined ES—or a land-use likely to secure that service—is being designed for payments for ecosystem services (ES) "bought" by an ES buyer from an ES provider if, and only if, the ES provider secures ES provision (conditionality). For the PES scheme to work there must be a willing buyer of a particular environmental service who transfers a payment to a land-owning seller who is willing to adopt measures that ensure the sustainable provision of the particular service. PES schemes aim to address the market failure by providing financial incentives to ES and other types of rewards (such as capacity development, knowledge sharing, risk alleviation, etc.) to land users to maintain/improve the provision of valuable environmental services.

Payment of Ecosystem Service as Tool to Eradicate Poverty

PES can also have positive impacts on poverty (Landell-Mills and Porras, 2002; Pagiola et al., 2002a), because here monetary help is being provided to those people who are the deciding factor to maintain natural resources and these ecosystem services. One of the critical dimension of this work is to evaluate the potential of PES and linkage to the poverty reduction. There are various environmental services, which are available ranging from provisional, regulating such as climate regulation, hydrological flows, biodiversity conservation to carbon sequestration but the recent trends can be seen as degradation of these ecosystem services due to no compensation or very little incentives for the people who maintain it and services which these generate for others.

Now the problem recognized in above section, gives us an opportunity to look for the solution in form to develop a system in which people who are generating, maintaining the benefits for users has to be paid for the environmental services. Recognition of this problem and of the failure of past approaches to dealing with it has led to efforts to develop systems in which land users are paid for the environmental services they generate, thus aligning their incentives with those of society as a whole (Landell-Mills and Porras, 2002; Pagiola et al., 2002a).

Payment of Ecosystem Services—A Global View

The payment of ES is used by various countries which are experimenting with PES scheme to reduce poverty, many with the assistance of World Bank.

World Bank support for PES schemes around the world as explained below:

- Costa Rica: The Ecomarkets Projects, which support the country's PES programme, include a US$32.6 million loan from the World Bank to help the government ensure current levels of environmental

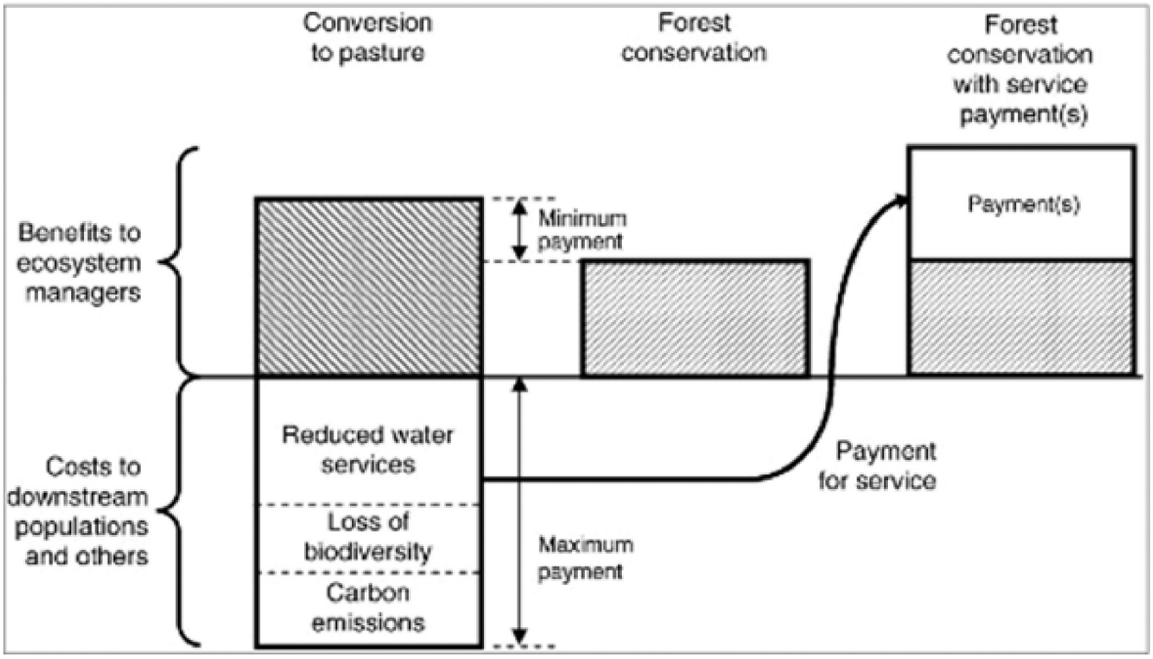

Figure 1: Basic concept of payment of ecosystem services scheme. (Engel et al., 2008).

service contracts and US$8 million grant from the Global Environment Facility (GEF) to assist the programme's conservation of biodiversity (FONAFIFO, 2000; Pagiola, 2002; World Bank, 2000).

- Colombia, Costa Rica and Nicaragua: The regional Integrated Silvopastoral Ecosystem Management Project (RISMEP) is piloting the use of the PES as a means of encouraging a shift from unsustainable practices to sustainable silvopastoral practices (Pagiola et al., 2003a; World Bank, 2002).
- Guatemala: The Western Altiplano Natural Resources Mangement Projects (known as MIRNA from its Spanish acronym), under preparation, will include a component aimed at testing and piloting PES mechanisms at the local level and support the development of the required national policy framework and instruments.

Krygyz Republic Profile and Evaluation of Ecosystem Services in the Country

The Kyrgyz Republic is a landlocked country in north-eastern central Asia with 94% of the country located more than 1000 m above sea level. It has a population of about 5.3 million out of which 43% are living below poverty line. Here 50% of the population is rural dwellers and agriculture contributing to about 33% of GDP. Over 50% of the country's GDP is derived from climate and weather sensitive activities. The main climate events are droughts, mud and water related events. This work focuses on the water sector ES in the country. This makes development of PES schemes in the Kyrgyz Republic designed around the good amount of water resources available and under-used ES in the country. The country has 3500 large and small rivers in seven main basins: Syr Darya, Amu Darya, Chu, Talas, Ili, Tarim, and Issyk–Kul with an average annual flow of these rivers as 44.5 billion m^3. A large portion of Kyrgyz irrigated land is supplied with water from smaller rivers (806,000 ha or 76% of irrigated area); of this, 89% are fed from unregulated flow.

A total of 3500 rivers from eight major and important hydrological basins cover the total regional and national needs of Kyrgyz Republic. Out of this total water resource, irrigation use accounts for (93%), human consumption around (4.6%) and productive purposes (2%). This generates 90% of electricity; however only about 0.1% of the total government expenditure is spent on water related matters. This figure in Kyrgyz Republic urges for potential of using PES in water sector in order to reduce poverty in the region.

Research Questions, Aims and Objectives

The research questions which are the basis of the report are directly explained with the goals:

(a) Exploring the potential of "Payment of Ecosystem Services" in Kyrgyzstan to alleviate poverty?
(b) PES can provide extra income to locals/villagers in Kyrgyzstan?
(c) What policy-research interface can be designed in order to make PES tool powerful enough to alleviate poverty in Kyrgyzstan?

Table 1: Renewable surface water resources by major river basins in Kyrgyz Republic

River Basin	*Region*	*Part of territory (%)*	*Internal RSWR (km^2/year)*	*Outflow to*	*Outflow secured through agreements (km^2/year)*	*Actual RSWR (km^2/year)*
Syr Darya (Naryn, Chatkal	West	55.3	27.42	Uzbekistan and Tajikistan	22.33	5.09
Chu, Talas and Assa	North	21.1	6.74	Kazakshtan	2.03	4.71
Southeastern (Tarim* basin)	Southeast	12.9	5.36	China	-	5.36
Rivers of lake Issyk-Kul**	Northeast	6.5	4.65	Endorheic and internal basin	-	4.65
Amu Darya (Kyzyl Suu)	Southwest	3.9	1.93	Tajikistan	1.51	0.42
Karkyra (lake Balkhash basin)***	Northeast	0.3	0.36	Kazakshtan	-	0.36
Inflow from west slope of Barfuke mountain						0.558
Total					25.87	21.148

*Tarim river is located in China.

** This is an endorheic basin and all rivers flowing into it originate in the country, therefore outflow does not include this basin.

*** Lake Balkhash is located in Kazakhastan.

The basic goal which we are exploring in this paper is exploring the potential of payment of ecosystem services under water-related ecosystem service in the Krygyz Republic in central Asia to reduce poverty. Also focusing on the kind of payment method which can be used for implementing PES. A very important aspect is to explore the policy research interface to make it a powerful tool.

Methodology

The methodology designed for the Krygyz Republic to evaluate and develop a PES scheme for Kyrgyzstan to alleviation of poverty is based on the case studies which are already completed successfully and recommendations are used as the basic tool for designing these methodologies; along with the case studies around Nepal are taken into consideration due to similar kind of landscape and water related ES strength. The six-fold design methodology is:

Step 1: Identification of ecosystem services (watershed or upstream and downstream relations) being provided by the country and their landscape management efficiency providing these services.

Step 2: Identification of service providers and beneficiaries in the identified landscape. Exploring discrete groups of providers and beneficiaries in the region.

Step 3: Identification of the level of services are required in the region and its monitoring is important factor for long-term benefits.

Step 4: Identification of effective payment scheme (could be helpful) in Kyrgyzstan: direct payment, mitigation and offsets, or certification.

Step 5: Comparison of supporting institutions and network in the region, if not creating one with the help of local government and communities in the form of policies.

Step 6: Designing of PES scheme and local interventions.

Case Study Description

Implemented "PES" Scheme in 'Chon-Aksuu' Region of Kyrgyz Republic

The case study which is choosen to study is already successfully implemented as payment of ecosystem services in Chon-Aksuu region of the Kyrgyz Republic studied as the basis of the proposed study area and implementation of the future PES scheme in another region of the country. The water issue in the Chon-Aksuu watershed clearly shows the interdependence between upstream and downstream nature use activities.

The Case Study Area

The case study area to implement PES scheme is in the Chon Aksu watershed, Northern side of the IssykKul lake, Kyrgyz Republic using stake-holder as pasture committee, water user association and an NGO. To link them and address this problem, NGO has set out to devise a PES scheme where upstream pasture and forest users act as "sellers" of ecosystem services (by improving their land use, they can provide additional water-related ecosystems services) while downstream water users and mushroom pickers act as "buyers" (as they benefit from the services provided by the upstream ecosystems).

Application of the Framework

The application of the pilot PES project in Krygyz Republic was done by using a strong mediatory organization, which provided the strong support as brokering the deal, implementation and monitoring between communities and associations. The framework designed executed and decided as the Water Users Association pays in labour to the forest administration as 10 mandays a year to help in tree plantation, fencing and other work and also to the pasture committee with 20 mandays a year for pasture quality improvement. The Mushroom Pickers Association pays in labour the forest administration as 30 mandays a year to help in soil preparation, tree plantation and other activities and tourists pay in cash the Forest Administration the entrance fee in the valley with 20 soms/person and 50 soms/car which make this as a very desireable solution under PES scheme.

Contributing Factors

The result shows that the major contributing factors for the case study being successful are the decision of understanding value of a strong intermediary organization; next was the availability of clear scientific data on the status and necessary activities to improve ecosystem services. Identification and correctly negotiated ES 'buyers' are willing to pay for the delivery of a particular ES. The size and form of payment is accessible to the 'buyers' and is interesting for 'sellers'. A good monitoring plan, reconciled with all the stakeholders, will ensure the sustainability of the scheme.

Study Areas Identified in Krygyz Republic

Potential Sites for Implementation of PES Scheme

On the basis of pilot project in Kyrgyzstan and a good knowledge and understanding of implementation of PES scheme around the world, the site is proposed as study area which has high potential of implementing PES scheme in Kyrgyz Republic.

Identified Potential Site: Naryn River Watershed

The Naryn River (another name - Alabugatuz) flows in the territory of Kirgizia and Uzbekistan. Merging with the Karadarya river it forms the Syrdarya river. The length of the Naryn river is 807 km, its watershed area is 59,000 km^2. The river itself is formed by merging of the Bolshoy Naryn and Maly Naryn rivers sprung in the Central Tien-Shan glaciers. In the upstream, there is the Naryn State Reserve with an area of 91,023,500 ha. The Naryn water is used for irrigation, and the river also gives rise to the Bolshoy Frgana Channel and Norhern Fergana Channel. There are several power stations: the Toktogul, Tash-Kumyr etc., through the whole length of the river.

The PES process for the region has been developed in the watershed in context with emphasis on the view to providing a continuous flow of drinking water or looking into the problem of dealing with this also developing a linkage between upstream communities and Naryn province civilians, promoting flora and fauna available in the watershed, and addressing the livelihoods of the poor community in the upland region. The scheme has been tailor-designed by incorporating the key features in accordance with the local context and needs as shown in Figure 2.

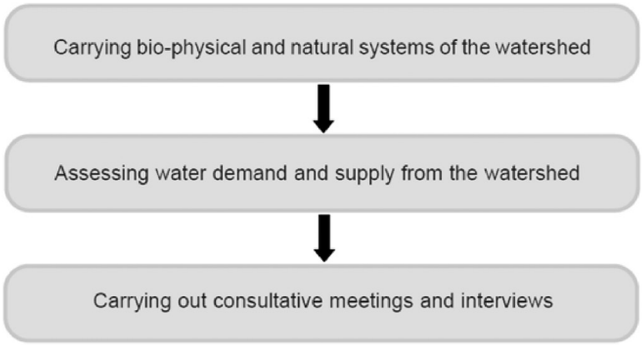

Figure 2 : Identified PES approach for Naryn watershed.

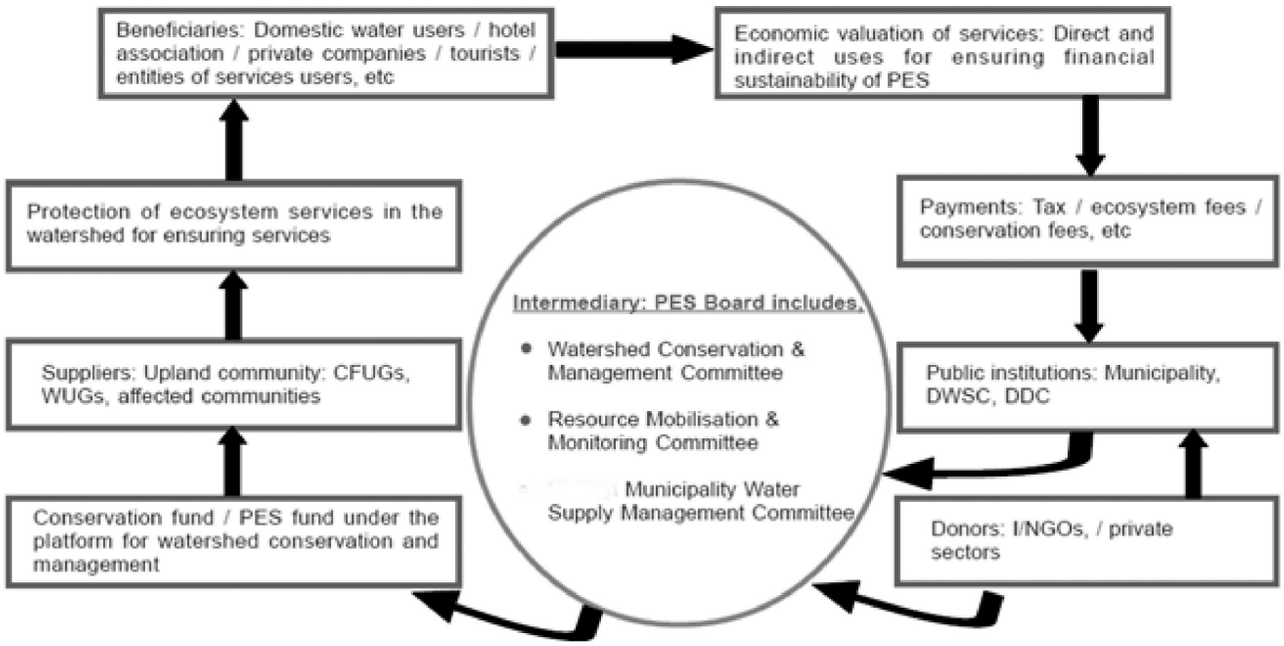

Figure 3: PES scheme for Naryn watershed.

Figure 4: Issyk-kul protected area site location.

The economic valuation of ecosystem services—goods and services—is a new concept, especially in developing countries as Krygyzstan. Some studies have used different methods of valuation for traded and non-traded goods and services, depending upon the availability of resources and information. Prospects of pro-poor PES mechanism are mentioned in following section.

The income source identified can be used primarily in the poverty reduction mechanism and in the land system stabilisation. After a certain period, the upstream poor community may serve as a service provider and the downstream poor community as a service buyer.

For conservation fund, financial mechanism and payment system, in case of Naryn watershed, service providers have not been clearly defined. Despite this, a conservation financing mechanism has been assessed to know service providers (upstream and midstream) and the needs of service users (people in downstream and in Naryn Province.

The legal and institutional framework are important in the region and some major institutions are: public institution like local authorities, regional authorities, and national authorities; and private institutions such as non-governmental organisations and civil society associations.

Potential Site 2: Issyk-Kul (Protected Area)

Proposed methodology in implementing PES scheme, which is identified on the basis of protected area and after understanding the Issyk-kul protected area, it looked potential for PES scheme. This is based and recommended on the studies for payment of ecosystem services of protected area in Nepal.

In the Issyk-kul protected area the role of government, park authorities and middle NGO seems very interesting. The payment method can be designed with the initial funding to be sustainable in future. Figure 5 shows the PES process for the potential site.

Result and Discussion

The two potential sites are identified in Kyrgyzs Republic and proposed methodology given in order to develop the PES scheme in the region which are based on hypothesis and developed after the comparison with the cases around the world. Similar geographical condition was the base to choose and recommend here as potential site in Krygyz Republic.

Opportunities and Challenges for PES Scheme to Eradicate Poverty in Kyrgyz Republic

Opportunities with PES in Kyrgyz Republic

Payment for Ecosystem Services in Kyrgyz Republic may provide a mechanism which can improve the way to reduce poverty from the country using the management of watersheds and other natural systems. Many PES schemes around the world apply WUA fees to land management activities upstream that result in enhanced water quality and quantity for downstream

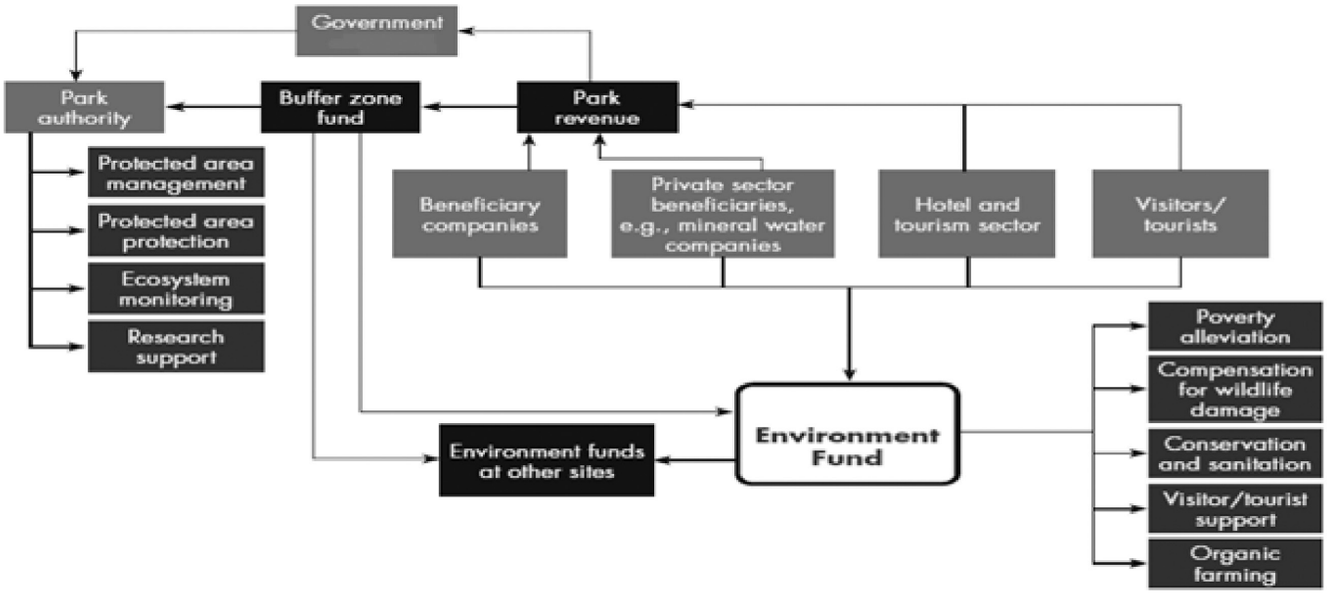

Figure 5 : Identified designed PES approach for Issyk-kul protected area.

users (Porras et al., 2008). The fee-for-service nature of WUAs in Kyrgyz Republic can help capture the value of watershed services, and is well suited to the PES model, particularly at the local level. Payments intended for specific social benefits can also be channelled through associations, where members are motivated to monitor one another to ensure compliance so that the payment is received (Porras et al., 2008).

To make PES sustainable at long run, it is important to make scheme through direct payments, which shows the requirement of donor funding in scheme initially. This will be a help for addressing buyer's concern about high up front cost at Naryn Basin and Issyk-kul. Sellers might also consider diversifying their source of income from carbon or biodiversity markets. In these cases, a trust fund can be established by an intermediary (like an NGO) to pool different sources of finance and manage payments.

Challenges with implementation of PES in Kyrgyz Republic

Payment for Ecosystem Services in Kyrgyz Republic has to face many challenges as in the country there is lack of firm regulations and enforcement to incentivise payment for ecosystem services. The major challenge would be identifying the appropriate buyers and sellers. Major focus will be on the existence of legal contract mechanisms between buyers and sellers which is currently an adhoc process in the country because of poor understanding of PES among stakeholders and possible sellers and buyers and payments are seen as cost prohibitive.

Policy Development Framework for Implementation of "PES" in Kyrgyz Republic

The importance of policy-research interface in order to provide the assistance to PES scheme to implement properly and for the purpose of reducing poverty is shown in Figure 6.

Policy Recommendations for Poverty Reduction Using "PES"

- The guide for implementation of PES in the legal and cultural context of the country would be a useful tool for policymakers, implementing institutions, and other stakeholders interested in exploring or using PES to improve water quality and watershed management. The guide should include an analysis of laws, practices, and institutions in the country.
- Designing of pilot projects like CAREC's efforts to design a PES project along the Chon-Aksuu River in Kyrgyzstan have advanced the idea of PES in the country. Pilot projects are important as to help inform design and best practices for PES implementation.
- Workshops and outreach activities have initiated interest and increased knowledge at community level and the implementation of PES must be the next phase to generate a more sophisticated understanding of the feasibility of PES.
- To keep engaging the wider range of world wide exposure and examples from Vietnam, Costa Rica, U.S. and around the world.

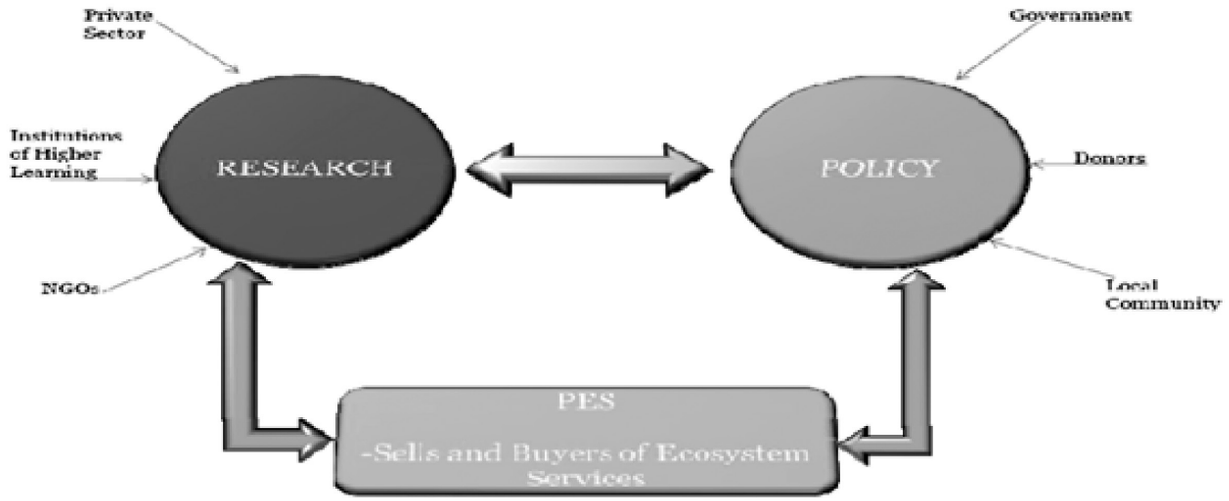

Figure 6: Proposed policy research interface for Krygyz Repulic.

- To investigate the possibilities of training and capacity building on natural resource management practices to the country have capability to implement activities funded by PES payments.

Conclusions and Recommendations

The review of recent interest and efforts in PES among Central Asian non-governmental organizations and international donors have provided a unique opportunity to apply this innovative tool in the country context.

Key Findings and Limitation

The first and important finding in the work is that PES can become a helping hand to reduce poverty from Kyrgyz Republic with a mode of generating an extra income for poor but we cannot say it is very effective and completely capable of eradication of poverty from the country. The conclusions are recommending the government to set up an institution established to bring together ecosystem service buyers and sellers (KAESBS – Krygyz association of ES buyer and seller). The important step is to design the mechanism so as not to exclude poor land users by keeping transaction costs as low as possible, and being creative in responses and strong local organizations such as community groups or NGOs participation plays a great role in designing and negotiation process.

The site identified based on the pilot project by CAREC can be used as the building block to design further PES scheme in Krygyz Republic. The key findings are most dependent on the factors like interest among stakeholders for new tools to address water resource management, a very strong local organization which can do the mediation in implementing the site projects, broker the agreement between sellers and buyers and monitoring the project in further stage and various tensions between downstream and upstream water users.

There are many challenges also seen in this country context which must be addressed and understood. For example, a lack of strong regulation or enforcement does not provide incentives for land users to improve practices or generate demand for an ecosystem services market. Further, given land tenure arrangements in Central Asia, service providers may include government land management agencies, which may be problematic in maintaining buyer confidence that ecosystem services would be improved or maintained.

Recommendation for Further Work

The site locations identified can be seen as future scope for the work to start development of well-versed PES scheme and implementation of small-scale pilot activities. This will enable private organizations interested in promoting PES along with government agencies to get a deep understanding on the strategy to overcome the stated challenges and maximizing the current opportunities for PES in the country. The great deal of experience on PES from around the world could help to understand and design PES schemes in the region. The U.S. Forest Service looks forward to continuing to share information and providing U.S. experience in order to support local and government partners in developing PES in Krygyz Republic and Central Asia. Also looking at the Vietnam model of PES

can be helpful for the country seeking similar water sector PES design which are very helpful in alleviating poverty in the region.

References

A.M. Best (AMB) Company, 2010. AMB Country Risk Report: Kazakhstan. http://www3.ambest.com/ratings/cr/reports/Kazakhstan.pdf Web: 20 November 2010.

ADB-CAREC, 2008. Research Grants Program, Cooperative Study on Eco-tourism Based on Transport Corridor in China and Kazakhstan. Final Report, June 2008.

Alba, A., 2008. Kazakhstan National Forest Programme Update. Food and Agriculture Organization of the United Nations (FAO).

Burger, R., 1998. Water user associations in Kazakhstan: An institutional analysis. Environment Discussion Paper No. 45. Newly Independent States Environmental Economics Policy Project. Harvard Institute for International Development, Cambridge, MA.

CACILM, 2005. Central Asian Countries Initiative for Land Management. Inception Report and Application (2004-2005).

Dudwick, N., Fock, K. and Sedik, D., 2007. Land reform and farm restructuring in transition countries: The experience of Bulgaria, Moldova, Azerbijan and Kazakhstan. World Bank Working Paper No. 104. The World Bank, Washington, DC.

Emerton, L. and Iftikhar, U., 2006. Investigating the Delivery of Ecosystem Economic Benefits for Upland Livelihoods and Downstream Water Users in Nepal. Policy Briefs 1-3. IUCN, Colombo, Srilanka.

Engel, S., Pagiola, S. and Wunder, S., 2008. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecological Economics*, **65:** 663-674.

Food and Agriculture Organization of the United Nations (FAO), 1998. AQUASTAT Information System on Water and Agriculture: Kazakhstan country profile. http://www.fao.org/nr/water/aquastat/countries/kazakhstan/index.stm Viewed 12 November, 2010.

Forest Trends, Katoomba Group, and United Nations Economic Programme, 2008. Payments for Ecosystem Services: Getting Started—a Primer.

Gray, J., 2000. Kazakhstan: A review of farm restructuring. World Bank Technical Paper No. 458. The World Bank, Washington, DC.

Greiber T., 2009. Payments for Ecosystem Services. Legal and Institutional Frameworks. Environmental Policy and Law Paper No. 78, IUCN.

Marjorie, H. and Upadhyaya, S.K., 2007. Watershed based Payment for Environmental Services in Asia. Working Paper No. 06-07. United State Agency for International Development and Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program.

Hamilton, K., Sjardin, M., Peters-Stanley, M. and Marcell, T., 2010. Building bridges: State of the voluntary carbon markets 2010. Ecosystem Marketplace and Bloomberg New Energy Finance, Washington, DC and New York, NY.

Houghton, K. and Mendelsohn, R., 1997. An Economic Analysis of Multiple-Use Forestry in Nepal. *Ambio*, **25:** 3.

ICRAF, 2006. Rapid Hydrological Assessment Guidelines in the Context of Environmental Service Rewards. World Agroforestry Centre and ICRAF Southeast Asia Regional Office, Indonesia.

IUCN Nepal, 2011. Integrated Watershed Conservation and Management Plan: Sardu Watershed, Dharan, Sunsari.

Jumagulov, A., Nikolayenko, A. and Mirkhashimov, I., 2009. Water quality standards and norms in the Republic of Kazakhstan. The Regional Environmental Center for Central Asia (CAREC), Almaty, KZ.

Kanel, K.R. and Sigdel, E.R., 2004. Economic Importance of Biodiversity Conservation in Nepal. *Kalpabriksha*, **159**. Department of Forests, Kathmandu, Nepal.

Karki, D.B., 2002. Economic assessment of CF in inner terai of Nepal—A case study from Chitwan District.

Karky, B.S. and Joshi, L., 2009. Payment for Environmental services—An approach to enhancing water storage capacity. *In:* ICIMOD, Sustainable Mountain Development.

Karn, P.K., 2007. A Study Report on Economic Valuation of the Churia Region. IUCN Nepal, CARE Nepal and WWF Nepal.

Kaufmann, D., Kraay, A. and Mastruzzi, M., 2010. The Worldwide Governance Indicators: Methodology and Analytical Issues. The World Bank, Washington DC.

Long, A., 2010. History of the National Fire Danger Rating System. Encyclopedia ID.

Erdenetuya, M. ICC/NRCS of Mongolia, 2010. Fire Occurrence and Monitoring in some Central Asian Countries: Kazakhstan.

Madsen, B., Carroll, N. and Moore Brands, K., 2010. State of biodiversity markets report: Offset and compensation programs worldwide. Ecosystem Marketplace, Washington DC.

PSU Center for Dirt and Gravel Road Studies, 2007. Dirt and Gravel Roads Assessment Guide.

Pagiola, S., 2007. Guidelines for Pro-Poor Payments for Environmental Services. Environment Department, the World Bank.

Porras, I., Grieg-Gran, M. and Neves, N., 2008. All that glitters: A review of payments for watershed services in developing countries. Natural Resources Issues No. 11. International Institute for Environment and Development, London, UK.

Robinson, S., Milner-Gulland, E. J. and Alimaev, I., 2002. Rangeland degradation in Kazakhstan during the Soviet era: Re-examining the evidence. Elsevier Science Ltd.

Sedik, D. and Lerman, Z., 2008. Land reform, transition and rural development. Development and Transition. Issue 11. LSE and UNDP.

Strategic Development Plan of the Republic of Kazakhstan, 2010. Concept of Environmental Security for the period 2004-2015.

UNCCD National Working Group of the Republic of Kazakhstan, 2006. Central Asian countries initiative for land management: Republic of Kazakhstan national programming framework. Draft.

Ujjwal, S., 2000. A Report on the Investigation of the Economics of Three Major NTFPs in the Siwalik Area of Ilam District. IUCN Nepal.

Weinthal, Erika, 2006. Water Conflict and Cooperation in Central Asia. Human Development Report, United Nations Development Program.

Wunder, S., 2005. Payments for environmental services: Some nuts and bolts. CIFOR Occasional Paper No. 42. Center for International Forestry Research.

Wunder, S., 2007. The efficiency of payments for environmental services in tropical conservation. *Conservation Biology*, **21(1):** 48-58.