



Payment for Ecosystem Services (PES) scheme implemented in the Cidanau Watershed, Indonesia.

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Short title: Cidanau Watershed PES scheme, Indonesia

Key Message: A Payment for Ecosystem Services scheme was implemented in order to value and account for ecosystem services in Cidanau watershed, Indonesia.

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What is the problem? What is the link to local policy?

Cidanau, in the province of West Java, is a watershed that supplies domestic and industrial water in Banten Province, Java Island, Indonesia. It is the only water supply for the people living in Cilegon (population 30,767)¹ and approximately 100 nearby industries. The watershed covers 22,260ha and includes the Rawa Danau reserve, a 200ha nature reserve with 131 endemic species as well as the only remaining lowland swamp forest in the Java Islands.

The Cidanau watershed has been experiencing rapid land cover change for almost two decades. Population increases coupled with a dependence on farming have led to forests being converted for agriculture.² The Rawa Danau reserve has also experienced heavy encroachment, up to 20% by 2000 (Darmawan et al. 2005) and a decrease in diversity of flora and fauna.

The main problems experienced by the water consumers of the Cidanau watershed are water quality degradation due to pollution, high sedimentation and great fluctuation in water flow. The average discharge is 12.3 m³/s, fluctuating from an annual minimum of 1.2 m³/s in the dry season to an annual maximum of 44 m³/s in the rainy season (Adi 2003; Munawir and Vermeulen 2007; Budhi et al. 2008).

What policy instrument builds upon information about ecosystem services?

To slow down the environmental degradation of the Rawa Danau reserve and the Cidanau watershed, a project was developed by the Forum Komunikasi DAS Cidanau (FKDC)³ and

¹ Cilegon City Profile 2005 - 2010

² The land cover of the Cidanau Watershed is mostly dominated by agricultural lands (71%); mixed farming (36.7%) and rice fields (34.4%) and the remaining 18.5% is forest and swamp forest (Adi 2003).

³ The sixty-four members of this forum are upstream and downstream stakeholders. The upstream stakeholders include farmer groups, government of Serang District, the Serang Legislative Body, Provincial Agriculture Services (Provincial and District Forestry and Environment), provincial and district planning agencies (BAPPEDA),

facilitated by local NGOs and The Institute for Social and Economic Research, Education & Information (LP3ES). The project's aim is to value and account for ecosystem services in the Cidanau watershed.

Payments for ecosystem services (PES) include buyer and seller communities. Seller communities consist of local people living upstream, organized into farmer groups. Buyer communities are water users and include local industries and people living downstream. At present, there is only one buyer group actively involved in rewarding the environmental services: the Krakatau Tirta Industry (KTI). It uses clean water for its steel industry operation and is the only company authorized to manage water from the watershed. There are, however, a number of companies and industries that are potential buyers.

Rewarding environmental services is based on negotiations between the buyer (KTI) and the seller (farmer groups). In these negotiations it was agreed that:

KTI will pay upstream farmers for reforestation (out of the annual government budget for tree-planting). Compensation amounts to US\$350 per ha per year, a price agreed upon in the Memorandum of Agreement between KTI and FKDC (represented by the Governor of Banten Province). Payment distribution is monitored and managed by FKDC. Following this agreement, further commitments were made by two more farmers groups⁴. The total agreement, to date amounts to US\$175,000 (100 ha x US\$350 per ha x 5 years).

The Memorandum of Agreement stated that KTI would pay in three phases from 2005 – 2010. They initially offered an annual payment of US\$75 per ha but this was later adjusted to US\$120 per ha if tree-planting quotas were met. Payments were also adjusted so that money could be set aside for a buffer fund in the case that KTI was unable to meet its obligations (Leimona et al. 2009).

Payment Allocation	US\$	Fraction of total payment
Payment for 100ha contracted farmland <ul style="list-style-type: none"> • 95 % for buying seedlings and planting • 5 % for investing on local business 	60,000	80 %
Transaction Cost <ul style="list-style-type: none"> • 40% for conducting capacity building & identifying more buyers (dissemination, publication, seminar, etc); • 27 % for monitoring and verifying fields activities; • 33% for operational costs: 	10,500	14 %

Provincial Human Capacity and Development Agency, Provincial Human Settlement and Regional Infrastructure Services and a Nongovernment Organization (NGO). Downstream stakeholders include representative of the PT.Krakatau Tirta Industry (KTI) (a private Water Company), Government and Legislative Body of Cilegon District, Agriculture Services and Urban Water Users. This body was later to become the primary coordination mechanism for PES.

⁴ The two farmers groups were from Citaman Village - 43 farmer members and the Cibojong Village - 29 farmer members.

<ul style="list-style-type: none"> ○ 16 % for paying personnel costs for five people; ○ 11% for organizing meetings; ○ 6% for administration purposes. 		
Tax	4,500	6 %
TOTAL *This amount is payment from KTI for Phase I & II (4 years) and means KTI has to transfer the rest (US\$100,000) on current performance.	75,000*	100 %

Sellers, namely farmers, are responsible for the maintenance and reforestation of their land. In 2007, the number of farmer groups that joined the project increased from 2 to 4 groups. Members are from 4 villages: Citaman (43 farmers), Cibojong (29 farmers), Cikumben (32 farmers) and Kadu Agung Village (38 farmers).

Based on FKDC estimates, transaction costs constitute approximately 14% of the annual payment to farmer groups. This percentage includes the cost of capacity building, identifying new buyers, information dissemination and monitoring.

Most of the funding is drawn from Corporate Social Responsibility funds (CSR)⁵.

Consequences and challenges

A clear assessment of the environmental outcome of this project is not available yet. The actual link between practices that promote watershed protection and water supply are unclear. The scheme so far has had a limited impact on watershed protection. The watershed is large and the scheme will have to include a larger region in order to have a significant impact. However, farmers have become aware of environmental issues such as erosion, landslides and downstream sedimentation. They have learned how to prevent erosion and how trees play an important role in water and soil conservation. Some reported that their household income increased by 30%. Others reported building a 100 meter pipeline to provide clean water to about 50 households.

It is not yet clear whether the compensation from buyer to sellers accurately represents the value of ecosystem services. This value has not yet been determined scientifically. Payment amounts, rather, were arrived at through negotiation. Agreed contract amounts may not include real opportunity costs for farmers due to other contributing factors such as an urgent need for money by the sellers, and that an intermediary played a dominant role in negotiations.

Looking forward, it will be important to identify specific watershed services and to assess drivers that reduce water quality – examining hydrology, land cover, sedimentation load and related indicators. Improvement to government regulations for PES schemes at the local level will also increase willingness to pay (in this case by large private companies). Further, to increase the

⁵ In Indonesia, a state owned company must allocate 1% of net benefit for developing environmental programs with the communities. The legal basis of this scheme is the letter of Ministry of State owned Company Affairs about Corporate Social Responsibility Partnership Program (KEP 236/MBU/2003).

profile of PES, this scheme must be included in the district's regional workplan, and also in the local component of the regional budget (Anggaran Pemerintah Belanja Daerah/APBD).

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SUGGESTIONS FOR FURTHER READING ON WATERSHED PES:

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