
Reflection on payment for environmental services: the case of the Working for Water program in South Africa

VERGARA-HERRERA, Alejandra Mariel*†

Universidad Nacional Autónoma de México, Facultad de Ciencias Políticas y Sociales.

Received January 7, 2015; Accepted September 22, 2015

Abstract

This document shows the problem that arises with the application of economic models of payment for environmental services as a mechanism for development and combating externalities that the ecosystems suffer from economic activity. We analyse the "Working for Water program" in South Africa, as an example of the commodification of payments for environmental services and the results achieved by this program are shown. Due to the failure of these market mechanisms, we encourage the creation of new ways of thinking to guide the construction of alternative life patterns of consumption and production into a more social and ecological rationality.

Ecologic economy, payment for environmental services, environmental externalities, ecological rationality, sustainable development.

Citation: VERGARA-HERRERA, Alejandra Mariel. Reflection on payment for environmental services: the case of the Working for Water program in South Africa. ECORFAN Journal-Republic of Cameroon 2015, 1-1: 1-14

* Correspondence to Author (email: alejandra.mariel@outlook.com)

† Researcher contributing first author.

Introduction

In the last fifty years, humans have altered the structure and functioning of ecosystems more rapidly and extensively than in any other period of humanity result of population growth, industrialization, agricultural development, deforestation, burning fossil fuels, among others; creating imbalances in natural systems of the planet.

Since the late seventies there was already a growing concern about the negative effects of environmental degradation; the publication of *Silent Spring* by Rachel Louise Carson, reflects these concerns. The Club of Rome called *The Limits to Growth* stoke international discussion include environmental issues in economic development issues to try to compensate for the discomfort caused.

Consequently, the concept of sustainable development would be adopted, following the publication of *Our Common future* to seek a fair consumption of natural resources based on an inter and intra-generational equity. Thus, the environment becomes an element to be taken up in the traditional economic theory (neoclassical) and included in their models, leading to results of study branches as environmental economics and the economics of natural resources to encourage the transition to a model of more sustainable development.

The impact of this concept was of such magnitude that international organizations that guide its work in development models, such as the United Nations Program for Development, the Inter-American Development Bank and even the World Bank, began to incorporate it into his speech and practice.

However, there are disputes over the results achieved by sustainable development has not been seen as a benefit equally in the economic, social and environmental pillars. Some critics as Joan Martínez Alier, Jorge Enrique Leff and Riechmann, argue that the concept does not break with the logic of the foundations of neoclassical economics, that is, that has become the natural goods and services in another commodity, minimizing its importance.

The idea is still aspiring to development and sustained economic growth, within a vision of a closed economic system where there are considered the exchanges of matter and energy to the environment and leave only minimum requirement of some resourcing future generations, not specifying quantity and quality.

In this situation, the research focuses on the aspect of the internalization of negative externalities of economic activity, including the idea of sustainable development. Through the case study *Working for Water Program* in South Africa, being a clear example of the commodification of payments for environmental services and the results achieved by this program are shown.

It also reflects on the system of payments for environmental services and how the objectification of the environment does not seem to be a real solution to improving quality and social welfare, as well as compensate the damage in natural systems.

The rest of the paper is organized as follows, in paragraph two market failures are explained and how are you externalities are internalized into economic models; in the third paragraph, the *Working for Water program* in South Africa as an example applied on the payment of environmental services and the few results that brought such a model is developed.

In the fourth section, the problems that arise with the system of environmental payments are detailed; in the fifth paragraph, the principles of ecological economics are exposed, posing a new worldview and the environmental design of interlocking economic element, in order to give direction to the discussion of this subject, encouraging the creation of new forms of thought guide the construction of alternative life patterns, consumption and production in a more social and ecological rationality.

Market failures, environmental degradation and internalization of externalities

In the late sixties and early seventies, a period marked by events such as the breakdown of the Bretton Woods system and the crisis of development systems, also initiated concern for environmental issues in the international arena. In 1972 the Club of Rome¹ he published *The Limits to Growth*, a report that dealt with the irrationality of population growth rates until then achieved industrialization and natural resource demanding exponentially. Warning that if the trends continued in the short term the biophysical limits of the planet and threaten the existence of human life in the next hundred years suggesting economic growth target "zero" or stationary so they could recover some resources.

¹ The Club of Rome works as a platform that brings together scholars, scientists, politicians, businessmen and officials to design, develop and implement effective models to address many global issues have been related, such as environmental sustainability, growth performance economic, the consumption of resources, development and globalization. See [URL: <http://www.clubofrome.org>]

These concerns go beyond the biocapacity of the Earth helped to bring States to enter into negotiations regarding the environment and for the first time, is included as a guiding principle of holding international summits. Reflecting this, it is holding the United Nations Conference on the Human Environment in Stockholm, Sweden (1972), where the Stockholm Declaration was adopted² which established twenty six general principles for the preservation and improvement of nature, both for present and future generations.

Despite this promising start, the environmental issue would be taken up again until 1987 with the creation of the World Commission on Environment and Development to evaluate the processes of environmental degradation and the effectiveness of environmental policies to address them. The Commission published a document entitled *Our Common Future*, encouraging States to changing consumption and production patterns, including inter- and intra-generational equity, as a condition for human survival.

Thus, it is coining the term "sustainable development", defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987: 67). In order to promote a joint effort among the nations of the world to feature dissolve the contradictions between environment and development (Leff, 1993).

Our Common Future clarifies that sustainable development would only be achieved in three key dimensions: economic, environmental and social sustainability.

²The Stockholm Declaration can be found at [URL: <http://www.ordenjuridico.gob.mx/TratInt/Derechos%20HUMANOS/INST%2005.pdf>] (accessed 11/24/2015)

Through efficient use of resources in order to further economic growth; preserve the environmental goods and services and the struggle for social equity. In theory, all three dimensions should interact harmoniously; so that the process would translate into economic growth rates that eradicate poverty and generate greater prosperity but at the same time, will contribute to the improvement of the environment (Laguardia, 2013).

Since its construction, the concepts of sustainable development believe in the ability of the economic system to internalize ecological and social conditions of fairness and justice; by the same market mechanisms that were still operating. From the perspective hegemonic capital, problems of poverty and ecological did not arise as a result of capital accumulation; On the contrary, by assigning property rights and common property prices, market forces would be responsible for setting the ecological imbalance and social differences (Leff, 1993).

Later, in 1992, he held the United Nations Conference on Environment and Development, which resulted in the Rio Declaration³, in his first 16 addresses the internalization of negative externalities: "National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear with the cost of pollution, with due regard to the public and without distorting international trade and investment interest. "

Thus, the fundamental cause of the environment was reduced to a completely economic origin, on the premise that agents are able to transfer part or all of the cost of its shares to other segments of the population without exist by compensation. When these costs do not impact on the agents that cause them, there is no motivation or incentive to change their behavior or become interested in reducing the cost of their actions on social welfare and even less environmental.

Consequently, they were setting up alternative work for the market where previously could not. That is, using economic instruments in environmental protection criteria of cost-benefit and so the actors could take guided prices alteration to the decision. Then solutions include command and control measures, supported by market instruments and sometimes in combination with indirect measures such as the allocation of property rights and the reduction of transaction costs (OECD, 1995).

In terms of command and control measures, the government sets an optimal level of production and consumption of a particular environmental good or service; because they are not enough government regulations, it is generally supported by market instruments. The first of this is through taxation, where polluters or damage an environmental good must pay based on the severity of the action caused. The second mechanism is through a subsidy, it is that those who cause a positive externality, should receive a subsidy to encourage environment-friendly behavior. However, the mechanism is turned off, as there is a low government interference, this mechanism is better understood by the payment of environmental services (Bright, et al., 2004).

³ Véase: [URL:

<http://www.un.org/spanish/esa/sustdev/agenda21/riodeclaraation.htm>] (consultado el 24/11/2015)

According to Wunder (2006), payment systems for environmental services (PES) are based that service users make a payment to providers of the same so that they retain and / or rehabilitate ecosystems that provide such services. Its sustainability depends on the continued payment or compensation, and the application of a set of principles as additionality, permanence and leakage avoided. Currently, four types of PSA include:

- Mitigation of greenhouse gases: by fixing, reduction, carbon storage and other gases;
- Protection of biodiversity through sustainable use of species, conservation of ecosystems and ecological processes and access to components of biodiversity for scientific and commercial purposes;
- Conservation of scenic beauty derived from the presence of forests and other attractive landscape for the development of ecotourism, scientific tourism and adventure;
- Protecting water resources: in terms of quality, distribution in time and quantity for urban, rural, industrial and hydropower use, through the protection and sustainable use of aquifers, springs, water sources, protection and recovery of watersheds and micro, among others (Espinoza, 1999).

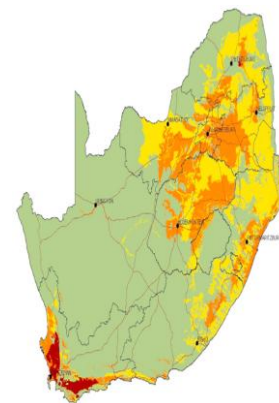
Often you can offer services synergistically to organize pay packages between multiple users, but note that not all services are being threatened, or rare, not all users are willing to pay in all regions (Wunder, 2005).

While PSA systems are emerging as a good alternative to the failure of the market to include negative externalities, they can also present difficulties such as lack of information or uncertainty about the functioning of the ecosystem; lags in time and space alterations of the environment or the recognition of environmental problems (Wertz-Kanounnikoff, 2006) as discussed below.

The Working for Water program in South Africa and the payment of environmental services for the protection of water resources

South Africa is one of the countries with high levels of water stress, water availability per person ranges between 500m³ and 1000m³ per year, surface water is usually exported to neighboring countries and the mantles water is scarce (Turpie et al. 2008). In response to this problem, the government launched a PSA through the Working for Water Programme (WfW), founded in 1995.

The program began as a government effort to eradicate exotic invasive plants that could alter the quality and quantity of water resources and endangering the endemic aquatic plants, harming ecosystems, as shown in Figure 1.



Source: Rouget

Figure 1 Vulnerable ecosystems, endangered and critically threatened in South Africa

WfW current objectives are to ensure water resources and protect the integrity of natural systems through removal of invasive plants and thus reduce soil erosion, flooding, improve river runoff, prevent salinization of rivers, swamps and estuaries that protect biodiversity. Socially, it seeks to optimize social benefits by creating jobs in the most marginalized people in South Africa and economically, economic empowerment and development related to cleaning of invasive plants (Walmsley, secondary industries would be facilitated et al, 2004).

In most PSA systems, vendors are (state, private, small-scale or communal) landowners. But in the case of WfW sellers are small suppliers contractors who perform restoration of land to any property. The selection criteria focus on workers choosing vulnerable to poverty and unemployed persons. Small contractors, rather than the landlords seeking services, bidding for contracts on the restoration of public or private land, where they specify how invasive exotic plants are in the areas defined and how they are treated. Tenders must relate to water supplies, reduction of forest areas burned or carbon sequestration ecological services as they are considered in the projects WfW (Magadlela and Mdzeke. 2004).

It is estimated that 80% of WfW annual budget comes from taxes and government budget Poverty Relief Fund. Thus, the WfW program focuses primarily on ensuring environmental services in territories controlled by the national government.

The Department of Water Affairs and Forestry (DWAF) has tried to encourage voluntary payments for the services of both municipal actors as private actors and you can tell that some actors have paid into the program for its employees to clean up their basins of invasive species rather than incur the costs of establishing their own systems clean, take advantage of the institutional structure of the WfW (Ferraro, 2009).

However, the DWAF system does not distinguish between rich and poor consumers of water services. For payment, the total volume of water consumption recorded by agricultural, domestic and industrial sectors and is divided, according to affordability and security of supply is calculated. Initially, only the domestic water users are doing a full charge, while agriculture received a substantial subsidy and the private sector did not contribute anything, or the forest by considerations of affordability; It leaving little income for WfW as shown in Table 1.

	1995/ 96	1996/ 97	1997/ 98	1998/ 99	1999/ 2000	2000/ 01	2001/ 02	2002/ 03	2003/ 04	2004/ 05	2005/ 06
Poverty relief programmes	25,000	50,000	150,000	125,426	126,370	232,180	314,813	330,000	330,000	370,121	354,753
DWAF core funding	7000	90,000	115,000	70,700	59,653	57,110	35,250	46,424	17,264	16,608	
Water tariffs through DWAF					23,200	27,900	24,400	48,400	38,800	26,335	27,915
Water tariffs through other water management authorities		4291	11,059	10,000	12,500	2800	500				
Local authorities and TCTA		20,000		218	1985	1000	400	50	400	2400	3400
Foreign funding ²		43	377	8915	6693	4687		2300			
Private sector ³		2046	5334	975	314	300	300				
Total budget	27,046	86,668	251,436	260,534	241,762	328,520	397,523	416,000	415,624	416,120	402,676

Source: Working for Water, unpublished data.

¹Initial partnership with Rand Water (the water management agency for the greater Johannesburg metropole) came to an end without a new partnership being negotiated.

²From Finish and Norwegian governments.

³Formal funding partnership with the private sector agencies came to an end; clearing by private sector companies is still on-going but not reported on.

Source: Turpie

Table 1 Funding for the Working for Water Programme, 1995-2006

The program should increase payments to private users of water supply, especially those for industrial use and increase the payment for the work they do to protect accounts to ensure the continued provision of services because to do so would be forced to compete for funds aimed at poverty alleviation (Turpie, et al, 2008).

The lack of resources and a genuine internalization of the costs of water services have affected the fulfillment of the goals of WfW on the three pillars of sustainable development. In ecological, to 2004 it had been achieved only cleaning 927 000 hectares, representing only 5% of terrestrial priority conservation areas are seen benefiting from the removal of invasive plants. There is also no certainty to quantify the increased flow of rivers or water security improved.

On the social side, the alleviation of poverty by creating jobs 25-32000 per year, emphasizing the recruitment of women and young people has not been enough (Ferraro, 2009). First there is creation of permanent jobs, the cleanup of the program cover the income of four and up to eight months each year. It has also reported the delay in wage payment, which has caused that workers were forced to borrow at high interest rates, so instead of helping economic empowerment program increased the vulnerability of extreme poverty. Economically, the gains from the sale of water access service were estimated at a price of R1.25 to 3.11⁴. While secondary industries reached a minimum equivalent to less than R750 billion per year (Common Ground, 2003) gain.

You cannot say that the WfW has failed because in some way has managed to reverse the invasion of plants in water resources, it has helped to stop its expansion.

⁴ 1 South African rand corresponds to US \$ 0.07, the exchange rate of November 25, 2015.

The UNEP (2009) recognizes that PES projects can be inefficient to: generate net social benefits; satisfy the payment of additionality (include the cost of negative externalities); allow the movement of activities harmful to the environment in other areas and / or be unsustainable in terms of not maintaining incentives to providers of environmental services.

You can judge the effects of many PES, partly because it is not clear who is being paid to comparison of traditional market transactions and partly because it requires an estimate of what would have happened hypothetically without the scheme PSA. So it is not always possible to calculate the net social benefits of induced behavior scheme (UNEP, 2009: 10). Thus, one cannot say with certainty that the PSA are means to achieve sustainable development.

Problems in the implementation of payment for environmental services

Environmental services are understood as the ability of ecosystems to produce useful products for man; they provide food and water, regulate climate, besides being spaces for recreation and research (Esquivel, 2012). PES schemes do not necessarily constitute an instrument of great cost, because the success of these depends on the preconditions; that is, they operate best when services are visible and beneficiaries are well organized and user communities are well structured, have property rights, have a strong legal framework and access to resources (Mayrand and Paquin, 2004). This scheme preconditions for the operation is difficult to find in the communities because their structures are different in the same organization (Leff, 1986, 2004).

Moreover, Pagiota et. to the. (2005) emphasize that the PSA have some capacity to reduce poverty by payments received by owners of environmental services. However, PSA is not itself designed to reduce poverty; there may be synergies in program design to improve the economic condition of the town. But since his own construction, the PSA is limited to not delve into issues of equity and income redistribution (Echavarria et. Al., 2004).

Although the PSA is a rating system that has contributed to the political interest in preserving natural areas, it has also led to the commercialization of a growing number of ecosystem services and to impose market logic to attack environmental problems (Gomez Baggethun et-al, 2009).

As pointed out by Gómez-Baggethun (2011), the two approaches to the mechanisms of assessment of PSA, ie public intervention plays the role of regulator for correcting market failures through taxes and subsidies, or private involvement through transactions where environmental services can be bought and sold freely; They have been implemented in two ways: by creating a market for PSA and PSA encouraging.

It has been suggested that PSA may eventually lead to changes in property rights against the poor or against vulnerable groups such as indigenous communities (Kosoy et.al., 2007). This is due to the commercialization of the environment has led to environmental services were by nature of a public nature when dealing with global goods, seek to be embedded within privatization policies promoted from the eighties by the influence of the Chicago school (Stiglitz, 2002).

The commodification of environmental services took place then through monetization, ownership and marketing of services. There are several lines of criticism about this is because items that should not be for sale and you cannot draw a line as to what extent should be commodified or not (McCauley, 2006). The first line of criticism concerns the need to assess the elements of ecosystems in a way beyond a simple monetary value, for example; the sale of animal or plant species for human joy threatens biodiversity loss, so the commodification does not contribute to improving the environment (Prudham, 2007).

The second line of criticism is focused on other assessments that may have environmental services. For certain communities may have a strong symbolic value and cultural significance, due to the interaction of people with their environment and the importance of its elements for survival. This is closer to what Western scientific tradition might categorize as there is a symbolic chain of relationships (Ellen, 2001) relationship.

The third line includes the problem of dealing with things that are not produced by humans as goods. Karl Polanyi (1944.1957) described this situation as a fictitious commodity and mentioned the example of land that was incorporated into an interchangeable commodity markets. The fictitious commodity, in this case, environmental services, is difficult to introduce into the economic system precisely because it is not a commodity (Gómez-Baggethun, 2011).

It has even tried to force and ordering units to environmental goods and services to be incorporated into national economic accounts, reflecting the mechanistic analysis of man by commodifying their environment. The difficulty of separating each element of the ecosystem functions to become interchangeable units, still presenting a challenge as theorize Vatn and Bromley (1994).

But the issue is not in itself a method of improving the methodology for the PSA and Martinez-Alier (1998) mentions the services that nature provides to the economy they are not well worth the accounting system chrematistic⁵ typical of neoclassical economics for its immeasurable character.

The ecological economic policies put in manifest impotence of knowledge to understand and solve the problems that have generated forms of knowledge of the world; ignoring the degradation that has produced the economic activity carried out under the economic rationality and its contradiction with the environment (Leff, 2000). Therefore, the main problem is to address the environment from this encouraging market mechanisms uncertainties and contingencies irreversible, seriously compromising the ability of future generations to meet their own needs (Martinez, 1998).

Ecological Economics and the incommensurability of the environmental services.

Industrialization is considered a watershed in the development of society by enabling accelerated production processes, facing centuries of limited satisfaction of human needs.

Economic Theory (Neoclassical mainly) has a development around pricing systems and maximization of individual utilities, contemplating closed processes (in terms of energy flow) in the exchange of goods and services.

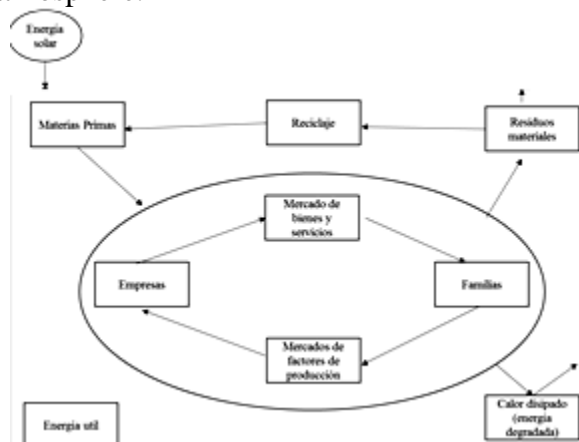
At no time they are considered own natural processes of recycling of chemical elements, such as the cycle of CO₂, which is accelerated by contemporary economic activity that only thinks in terms of value of merchandise isolated from the natural environment. Martinez and Roca (2006) point out in this regard as human production processes placed greater amounts of carbon dioxide from the process of photosynthesis you are able to take advantage of, or oceans to absorb, resulting in an increase in the greenhouse effect .

The introduction of thousands of tons of ore has exceeded the natural carrying capacity of ecosystems, especially synthetics, which are useless as being unable waste to be recycled by the market or by natural processes⁶, This goes hand in hand with the idea of final consumption takes Martinez and Roca (2006) criticizing the neoclassical theory that provides just that this seems consumed a well disappearing into the void without understanding their consumption represents the expulsion of energy and matter, as mentioned matter is recycled by the market and natural processes; while the energy is converted (First Law of Thermodynamics) but this is unable to generate new motion processes to degrade (Second Law of Thermodynamics).

⁵ Aristotle defines as Chrematistic the accumulation of money for money. In economics, the term is aimed at reducing costs and monetary value to benefits.

⁶ CO₂ is absorbed by plants; animal manure is degraded by microorganisms and becomes food for plants.

Figure 2 shows the behavior of ecological economics to expand the traditional concept of neoclassical theory only trade in goods, services and production factors between families and businesses (central circle), considering the degradation processes and energy transfer (Laws of Thermodynamics) and more importantly the relationship with the environment powered primarily by solar atmosphere.



Source: Torrado de Martínez y Roca (2006)

Figure 2 Cycle of energy and matter in the Green Economy

In short, nature serves a dual role in providing resources and be receiving waste. In addition, directly provides services ranging from the enjoyment of certain landscapes to the protection of life offered by the ozone layer absorbs ultraviolet rays. Provides services that nature and are not valued in the macroeconomy.

The market expands to incorporate medium and internalize externalities, ie costs are measured (in neoclassical terms) or benefits and are charged to those responsible. Martinez (1998) notes that authors like Kapp, Georgescu-Roegen, Daly and Naredo argue against that possibility of internalizing externalities, mainly due to lack of looking to the future generations in today's markets, even if these markets are enhanced by based on the willingness to pay, not on actual payments simulations.

We think that the current economic agents arbitrarily valued irreversible and uncertain effects of our actions today on future generations.

The cost-benefit analysis conducted by agents of the course in which there is a commensurability of value.⁷ When you have a multi-criteria evaluation in the absence of a single measure to classify all objects and situations in reality. That measure is the willingness to pay in the range for the satisfaction of individual preferences, so that there are subjective value scales to take action,⁸ which can be explained by hedonism from the pursuit of pleasure and away from pain.

Martinez (1998) and Roca (2006) considered the willingness to pay from the hedonistic perspective concrete measures the intensity of a person's preference for good, so having a strong commensurability and the possibility of considering the willingness to pay as a cardinal measure of value. However, this position is deceptive because the simplicity of trying to reduce a plurality of values to a single value that provides a unique classification of objects and situations. Even if pleasure were the last intrinsic value, could not provide a single criterion of value to order all goods, since the pleasures have a plural nature: the pleasure of drinking beer and pleasure of a good conversation are different, they cannot be measured on a single scale, (Martinez, 1998).

⁷ Commensurability means that there is a measure of value used to classify one way objects and situations evaluated. You can take a strong or weak sense as common as having a cardinal or ordinal interpretation. The weak commensurability must be distinguished in turn weak comparability, ie, the idea that one can rationally choose among various options without being able to give a single order (Martinez, 1998)g

⁸ See Menger (2012 [1871]) and Rothbard (2011)

As for preferences, they respond to the values, as I prefer because of its value to me and not because I value is preferred, (Fronzizi, 1972). It actually has a plurality of values, and our preferences from the action resolve conflicts between these values, (Mises, 1966). The plurality of values is not resolved by issues of cost-effectiveness as neoclassical economic theory believes, because the existence of incommensurable values presents more general difficulties for the whole economy, where the difference in value creates conflicts between agents, mainly to behave as rational violating the axiom of transitivity of preferences in social choice (Arrow, 1989, 1994).

Concluding remarks

The concept of sustainable development is adopted after the publication of Our Common future to find a fair base consumption of natural resources under inter- and intra-generational equity. The environment by introducing it as an asset in the neoclassical economic models becomes one more element, giving results as branches as environmental economics and the economics of natural resources, supposedly to encourage the transition towards sustainability. Payments for environmental services were structured with the idea of being a mechanism to internalize negative environmental externalities and thus provide communities offer a service that would preserve and / or restore ecosystems that provide those services through a monetary amount. However, payment schemes for environmental services are not necessarily a tool for optimal cost, because the success of these depends on the preconditions because the success of these depends on the preconditions; particularly property rights and a strong legal framework. Payments for environmental services can reduce poverty by payments received by owners of environmental services because these instruments are not designed to reduce poverty.

The rating system for payment for environmental services has led to the commercialization of a growing number of ecosystem services and imposed logic market to attack environmental problems. Creating an intervention seeking to correct market failures through taxes and subsidies or intervention through private transactions, where environmental services can be bought and sold freely, creating a market for PSA and PSA encouraging.

The main drawback of the commodification of ecosystem elements is that does not contribute to improving the environment. Leaving aside the different levels of ratings that may have environmental services to communities; It does not take into account the finite goods and the capacity of environmental services. Thus, ecological processes are objectified as natural capital, in order to be assimilated into the economic process; with a view to the reproduction and expansion of the system.

Thus, it is necessary to stop to contemplate nature only goods and consider ourselves as isolated part of the natural environment to guide rethinking production processes under an exchange of matter and energy, such as the green economy puts adding to it the modes of recognition of existing nature by the various communities that offer alternative lifestyles and more equitable patterns of consumption and production more sustainable are an alternative to the Western conception of sustainable development.

References

Arrow, Kenneth. 1989. *Opciones sociales y toma de decisiones mediante criterios múltiples*. Unión Editorial. Madrid.

- Arrow, Kenneth. 1994. *Elección social y valores individuales*. Planeta-Agostini. México.
- Bright, H. y U. Latacz-Lohmann. 2004. *Economics of Environmental Policy (study guide)*. Imperial College London, University of London. London, UK.
- Comisión Mundial del Medio Ambiente y Desarrollo (CMMAD). 1987. *Nuestro Futuro Común*. ONU. Nueva York, USA.
- Common Ground. 2003. *Working for Water: external evaluation. Synthesis report*. Southafrica.
- Echavarria, M., Vogel, J., Albán, M., Meneses, F. 2004. "The impacts of payments for watershed services in Ecuador – emerging lessons from Pimampiro and Cuenca". *Environmental Economics Programme International*. Institute for Environment and Development (IIED). London, UK.
- Ellen, R. 2001. "La geometría cognitiva de la naturaleza". Un enfoque contextual. En P, Descola y Gísli Pálsson, *Naturaleza y sociedad: perspectivas antropológicas*, D.F, México: Siglo XXI, 124-148.
- Espinoza, Nelson y J. Smyle. 1999. *El pago de servicios ambientales y el desarrollo sostenible*. RUTA. San José, Costa Rica.
- Esquivel, Elsa. 2012. *Mecanismos nacionales e internacionales de pagos por servicios ambientales (PSA) existentes*. Alianza México para la reducción de emisiones por deforestación y degradación. México.
- Ferraro, Paul. 2009. "Regional Review of Payments for Watershed Services: Sub-Saharan Africa". *Journal of Sustainable Forestry*, 28:525–550.
- Fronzizi, Risieri. 1972. *¿Qué son los valores?* Fondo de Cultura Económica. México.
- Gómez-Baggethun, Erik; de Groot, R., Lomas, P., Montes, C. 2009 "The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes", *Ecological Economic*, 69(6):1209-1218
- Kosoy, N., Martínez-Tuna, M., Muradian, R., Martínez-Alier, J. 2007. "Payments for environmental services in watersheds: insights from a comparative study of three cases in Central America". *Ecological Economics*. 61:446-455.
- Gómez-Baggethun, Erik. 2011. "Economic valuation and the commodification of ecosystem services". *Progress in Physical Geography* 35 (15):1-16.
- Laguardia, Jacqueline. 2003. "Pobreza y medio ambiente en el discurso global. Por una perspectiva de cambio" en G. Delgado, et. al. (edits.) *Crisis sociambiental y cambio climático*. CLACSO. Buenos Aires, Argentina.
- Leff, Enrique. 1986. *Ecología y Capital. Racionalidad ambiental, democracia participativa y desarrollo sustentable*. Siglo XXI. México.
- Leff, Enrique. 1993. *Globalización, Racionalidad ambiental y Desarrollo sustentable*. CEIICH-UNAM/Porrúa. D.F, México.
- Leff, Enrique. 2000. "Pensar la Complejidad Ambiental". en Leff, E (cord.), *La Complejidad Ambiental*, D.F, Mexico: Siglo XXI. 259 pp.
- Leff, Enrique. 2004. *Racionalidad Ambiental La reapropiación social de la naturaleza*. Siglo XXI. México.

Magadlela, Dumisani y N. Mdzeke, N. 2004, "Social Benefits in the Working for Water programme as a public works initiative", *South Africa Journal of Science*, 100: 94- 96.

Martínez Alier, J. 1998. "Curso de Economía Ecológica". *Serie de Textos para la Formación Ambiental*. Programa de las Naciones Unidas para el Medio Ambiente. México.

Martínez Alier, Joan. y Jordi Roca Jusmet. 2006. *Economía Ecológica y Política Ambiental*. Fondo de Cultura Económica. México.

McCauley, Douglas. 2006. "Selling out on nature". *Nature* 443 (7107): 27–28.

Menger, Carl. 2012[1871]. *Principios de Economía Política*. Unión Editorial. Madrid.
Mises, Ludwig von. 1966. *La acción humana*. Unión Editorial. Madrid.

OECD. 1995. *The Economic Appraisal of Environmental Projects and Policies: A practical guide*. Organization for Economic Cooperation and Development (OECD). Paris, France.

Pagiola, S., Arcenas, A., Platais, G. 2005. "Can payments for environmental services help reduce poverty? An exploration of the issues and the evidence to date from Latin America". *World Development* 33(2):237-253.

Polanyi, Karl. 1944/1957. *The Great Transformation: The Political and Economic Origins of Our Time*. Beacon Press: Boston, USA.

Prudham, Scott. 2007. "The fictions of autonomous invention: Accumulation by dispossession, commodification and life patents in Canada". *Antipode* 39: 406–429

Rouget, M., B. Reyes, Z. Jonas, P. Desmet, M. Driver, K. Maze, B. Egoh y R. Cowling. 2004. *South African National Spatial Biodiversity Assessment 2004: Technical Report. vol. 1 Terrestrial Component*. South African National Biodiversity Institute, Pretoria.

Rothbard, Murray. 2011. *El hombre, la economía y el Estado*. Union Editorial. Madrid.
Stiglitz, Joseph. 2002. *Globalization and its discontents*. Norton Press. New York: USA.

Turpie, J. K., C. Marais y J. N. Blignaut. 2008. "The working for water programme: Evolution of a payments for ecosystem services mechanism that addresses both poverty and ecosystem service delivery in South Africa". *Ecological Economics*. 65:788- 798

UNEP. 2009. *Making payments for ecosystem services work*. United Nations Environmental Programme (UNEP). Nairobi, Kenya.

Vatn, Arild and D. Bromley. 1994. "Choices without prices without apologies". *Journal of Environmental Economics and Management* 26: 129–148.

Walmsley, Daniel, T. Havenga, E. Braune, C. Schmidt, K. Prasad y B. van Koppen. 2004. "An Evaluation of Proposed World Water Programme Indicators for Use in South Africa". *Working Paper* (90). International Water Management Institute. Colombo, Sri Lanka.

Wertz-Kanounnikoff, Sheila. 2006. "Payments for environmental services: A solution for biodiversity conservation?" *Idées pour le Débat* (12). Institut du Développement Durable et des Relations Internationales. Paris, France.

Wunder, Sven. 2005. "Are direct payments for environmental services spelling doom for sustainable forest management in the tropics?". *Ecology and Society*. 11(2): 23.

Wunder, Sven. 2006. "Payments for environmental services: some nuts and bolts". Centro para la Investigación Forestal Internacional (CIFOR). Occasional Paper 42:24. Bogor, Indonesia.