

## PDF hosted at the Radboud Repository of the Radboud University Nijmegen

The following full text is a publisher's version.

For additional information about this publication click this link.

<http://hdl.handle.net/2066/197230>

Please be advised that this information was generated on 2021-06-17 and may be subject to change.

## Payments for ecosystem services and the fatal attraction of win-win solutions

R. Muradian<sup>1</sup>, M. Arsel<sup>2</sup>, L. Pellegrini<sup>2</sup>, F. Adaman<sup>3</sup>, B. Aguilar<sup>4</sup>, B. Agarwal<sup>5</sup>, E. Corbera<sup>6</sup>, D. Ezzine de Blas<sup>7</sup>, J. Farley<sup>8</sup>, G. Froger<sup>9</sup>, E. Garcia-Frapolli<sup>10</sup>, E. Gómez-Baggethun<sup>6,11</sup>, J. Gowdy<sup>12</sup>, N. Kosoy<sup>13</sup>, J.F. Le Coq<sup>7,14</sup>, P. Leroy<sup>1</sup>, P. May<sup>15</sup>, P. Méral<sup>16</sup>, P. Mibielli<sup>17</sup>, R. Norgaard<sup>18</sup>, B. Ozkaynak<sup>3</sup>, U. Pascual<sup>19,20</sup>, W. Pengue<sup>21</sup>, M. Perez<sup>22</sup>, D. Pesche<sup>7</sup>, R. Pirard<sup>23</sup>, J. Ramos-Martin<sup>6</sup>, L. Rival<sup>24</sup>, F. Saenz<sup>15</sup>, G. Van Hecken<sup>25</sup>, A. Vatn<sup>26</sup>, B. Vira<sup>19</sup>, & K. Urama<sup>27</sup>

<sup>1</sup> Radboud University Nijmegen, the Netherlands

<sup>2</sup> ISS, Erasmus University of Rotterdam, the Netherlands

<sup>3</sup> Boğaziçi University, Turkey

<sup>4</sup> Fundación Neotrópica, Costa Rica

<sup>5</sup> University of Manchester, UK

<sup>6</sup> Universitat Autònoma de Barcelona, Spain

<sup>7</sup> CIRAD, France

<sup>8</sup> University of Vermont, USA

<sup>9</sup> Université de Versailles Saint-Quentin-en-Yvelines, France

<sup>10</sup> UNAM, Mexico

<sup>11</sup> Universidad Autónoma de Madrid, Spain

<sup>12</sup> Rensselaer Polytechnic Institute, USA

<sup>13</sup> McGill University, Canada

<sup>14</sup> Universidad Nacional de Costa Rica, Costa Rica

<sup>15</sup> Universidade Federal Rural do Rio de Janeiro, Brazil

<sup>16</sup> Institut de Recherche pour le Développement, France

<sup>17</sup> Universidade Estácio de Sá, Brazil

<sup>18</sup> University of California, Berkeley, USA

<sup>19</sup> University of Cambridge, UK

<sup>20</sup> Basque Centre for Climate Change & Ikerbasque Foundation for Science, Spain

<sup>21</sup> Universidad de General Sarmiento, Argentina

<sup>22</sup> Universidad del Valle, Colombia

<sup>23</sup> IDDRI, France

<sup>24</sup> University of Oxford, UK

<sup>25</sup> Universiteit van Antwerpen, Belgium

<sup>26</sup> Norwegian University of Life Sciences, Norway

<sup>27</sup> African Technology Policy Studies Network, Kenya

### Keywords

Market-based policy tools; payments for ecosystem services; environmental governance; integrated conservation and development projects; ecosystem services.

### Correspondence

Roldan Muradian, Radboud University, P.O. Box 9104, 6500HE Nijmegen, the Netherlands.  
Tel: +31-2-4361-3058; fax: +31-2-4361-5957.  
E-mail: r.muradian@maw.ru.nl

### Received

18 July 2012

### Accepted

8 November 2012

### Editor

Catherine Tucker

### Editor in Chief note

This article inspired an alternative viewpoint presented by S. Wunder on page 230.

doi: 10.1111/j.1755-263X.2012.00309.x

### Abstract

In this commentary we critically discuss the suitability of payments for ecosystem services and the most important challenges they face. While such instruments can play a role in improving environmental governance, we argue that over-reliance on payments as win-win solutions might lead to ineffective outcomes, similar to earlier experience with integrated conservation and development projects. Our objective is to raise awareness, particularly among policy makers and practitioners, about the limitations of such instruments and to encourage a dialogue about the policy contexts in which they might be appropriate.

## Introduction

In an influential paper, Ferraro and Kiss (2002) argued 10 years ago that “direct” payments for biodiversity conservation were more effective and efficient than integrated conservation and development projects (ICDPs) and called for their adoption as policy tools to conserve ecosystems. Since then, the application of payments for ecosystem services (PES) has boomed (Pattanayak *et al.* 2010). The dominant theory for PES is based on the assumption that the undersupply of ecosystem services is the result of market failures, and therefore valuing and paying for such services will help to solve these environmental externalities (Engel *et al.* 2008). It is also argued that where providers of ecosystem services are poor landholders or disadvantaged communities, such payments can contribute to poverty alleviation (Pagiola *et al.* 2005). The possibilities of “win-win” scenarios are part of the reasons why PES have become so attractive, particularly among conservation practitioners and policy makers in developing countries (see e.g., van Wilgen *et al.* 1998; Miles and Kapos 2008).

This is not the first time that particular policy tools have become the dominant form of intervention for biodiversity conservation. Twenty years ago, for instance, after recognizing the limited success of protected areas for biodiversity conservation in developing countries, Wells and Brandon (1992) argued in favor of what they termed “integrated conservation and development projects (ICDP).” Gaining wide acceptance during the first Rio Summit on Sustainable Development, ICDPs shaped the agenda of biodiversity conservation in the subsequent decade. Christensen (2004, p. 7) pointed out that the main reason for their rapid dissemination was that “they offered something for everyone. They promised to defuse the major threats to biodiversity, create better opportunities for people to earn a decent living and gain access to basic services, and equitably address the rights and interests of everyone who uses land and resources in and around protected areas.” In other words, ICDPs came with the promise of “win-win” solutions. A decade later, however, more or less coinciding with the Johannesburg Summit on Sustainable Development, scholars and practitioners acknowledged that success with ICDPs was rather elusive (Hughes and Flintan 2001). Christensen (2004, p. 18) noted that the “the myth of win-win solutions created a culture in which overly ambitious projects proliferated, based on weak assumptions and little evidence.”

Today, we could be making a similar mistake with PES. Our aim is not to reject payments for the conservation of ecosystems altogether, and we acknowledge that win-win solutions at the interface of conservation and

development are possible, under particular institutional and governance contexts. Nonetheless, we caution policy makers and practitioners that an uncritical commitment to such policy tools can lead to unintended outcomes. PES face significant challenges, and a number of them remind us of the limitations faced by ICDPs. Later we summarize what we consider to be the most important of these challenges.

There is a heated debate in the current academic literature about the so-called “market-based” instruments for environmental policy, a generic term that has been used to refer to a wide range of tools such as cap-and-trade permits, certification schemes, biodiversity offsets, PES, and others. The debate includes discussions about their nature and typology (Pirard 2012), the conditions under which they are effective (Lockie 2013) and their social implications (McAfee 2012). The fortunes and woes of “market-based” instruments have been contested along disciplinary and ideological lines. Some see them as a promising policy option (Kinzig *et al.* 2011), but for others they constitute a good example of the “neoliberalization of nature” (McAfee and Shapiro 2010). Alongside the growing implementation of PES, voices critical of this way of managing ecosystem services are increasingly heard. According to some critical scholars, by “trying to sell nature to save it” market-based approaches reflect the contradictory logic of “green capitalism,” and neglect to address the ultimate causes of environmental degradation, namely the dynamics of capital accumulation in the current global economic system (Arsel and Büscher 2012). Spash (2011) discusses the conceptual flaws in neoclassical environmental valuation and the misleading ways that economic reasoning is used to justify PES schemes that may be ineffective or even counterproductive in preserving ecological services. Kosoy and Corbera (2010, p. 1229) argue that PES schemes reflect a “commodity fetishism” that reduces ecosystem values to a single exchange-value measure, and obscures the social relations embodied in “producing” and “selling” ecosystem services. In the same line, Krall and Gowdy (2012) and Burkett (2006) criticize the practice of reducing all the functions of nature to exchange value. Much of this stream of critique is informed by the work of Polanyi (1944, p. 73) who argued that to “allow the market mechanism to be sole director of the fate of human beings and their natural environment, indeed, even of the amount and use of purchasing power, would result in the demolition of society.” Acknowledging the varied contributions in this broad debate, our purpose here is to summarize and systematize what we consider the most important issues of concern in the particular case of PES.

## Not all payments are markets

First, we consider that the label “market-based” is not very appropriate to describe payments for the conservation of ecosystems. Even though PES have been conceptualized either as markets to reflect the scarcity of such—often unacknowledged—services and to internalize the external costs of ecosystems’ degradation (Engel *et al.* 2008) or as instruments of neoliberal conservation (Büscher 2012), in practice very few existing PES can be considered as pure markets. A market is a constellation of buyers and sellers involved in transactions. These exchanges are voluntary and goods or services are exchanged against monetary payments or through in-kind arrangements. The actors may be individuals, firms, public bodies, among others. Markets are typically characterized by the existence of various types of intermediaries and they require a high level of commoditization and conditionality. In other words, the good/service is provided only if the payment takes place and vice versa.

The debate about PES has been muddled by insufficient acknowledgment of the difference between incentives and market transactions (Muradian and Rival 2012). However, in the literature of behavioral economics, there is abundant evidence about the diversity of behavioral reactions to monetary transfers, which often differ from the predictions of models assuming humans as self-interested individuals that respond to price signals as maximizers of economic benefits in the market sphere (Bowles and Polanía-Reyes 2012). Most PES schemes do not fulfill the strict criteria that define markets (high commoditization; high conditionality; voluntariness), mainly due to the inherent complexities of socioecological systems and significant transaction costs (Muradian *et al.* 2010). Besides, the fact that most ecosystem services are either public goods or common pool resources by nature makes that their commoditization becomes very hard in practice (Farley and Costanza 2010). Furthermore, even if ecosystem services could be smoothly integrated into markets, such process could lead to unacceptable outcomes according to local notions of fairness (Pascual *et al.* 2010), which constitutes an important issue for concern among policy makers and practitioners. As Bromley (1990) points out, the goal of efficiency is not an objective criterion for policy judgments, but rather a value judgment. There is often a mismatch between the normative stances of market advocates, in which economic efficiency considerations prevail (Kinzig *et al.* 2011), and the dilemmas faced by practitioners and policy makers on the ground, where efficiency is only one of the many dimensions that need to be considered (Corbera and Pascual 2012).

## Outcomes depend on institutions

PES are expected to be effective in reconciling the interests of different agents and therefore they are often assumed to be less susceptible to “politicization.” The resolution of “market failures” through payments tends to be seen as a technical matter. In practice, however, as with any other policy instrument, PES are part of broader structures of power. Pressure groups might have a large influence on the design of payment schemes, shaping their effectiveness and distributional outcomes (Boyce 2002; Corbera *et al.* 2009). For instance, some studies report that national PES scheme in Costa Rica hold a low degree of environmental additionality, that is, it targets areas with low deforestation risk (Sierra and Russman 2006; Sanchez-Azofeifa *et al.* 2007), and tends to enroll areas with low opportunity costs, relatively large farms, and private firms (Porras 2010). This allocation of payments may be partly explained by the large leverage of the forestry sector in the scheme’s design (Le Coq *et al.* 2012). In the mid 1990s, this sector saw the emerging PES scheme as an opportunity to justify continuing direct public support to it. This favored the status quo over maximizing environmental additionality. Similarly, the payment program for ecosystem services in Mexico is also reported to hold a low degree of environmental additionality (Muñoz-Piña *et al.* 2008), again probably reflecting the high influence of some social groups. This scheme was closer to the interests of small farmers and indigenous communities (McAfee and Shapiro 2010), leading to greater importance being given to historical stewardship (over additionality) in targeting the payments.

The decision to give more weight to either rewarding good environmental stewardship or favoring previous entitlements, instead of to optimizing additionality, is essentially a political one. While not judging here such politically motivated decisions or outcomes, we would like to stress that: (1) the outcomes of payments depend to a large extent on the interplay of political forces (Vatn 2010) and (2) PES cannot be considered a priori as the most cost-effective policy option to achieve environmental goals or the most likely to deliver development benefits, as argued by some authors (Ferraro and Kiss 2002). In sum, the design of payments cannot be “depolitized,” and emphasis should be given to the process of policy design.

## Monetary incentives might crowd out intrinsic motivations

The effects of payments in inducing behavioral changes can vary substantially, depending on how the social

meaning of such payments is constructed. For example, payments might enhance or crowd out intrinsic motivations to undertake an activity (Frey and Jegen 2001; Bowles 2008; Charness and Gneezy 2009). The outcomes will depend on a variety of factors, including the magnitude of the payment, whether it is individual or collective, local notions of fairness, and the psychological, cultural, and social embeddedness of the concerned behavior (Gneezy and Rustichini 2000; Fehr and Falk 2002). Payments do not always strengthen social and ethical motives, and they may actually undermine such motives in some situations (Titmuss 1970; Bowles 2008). The likelihood of this happening is higher when the promoted tasks have an important prosocial component, or when a sense of altruism or moral consideration guide people's actions (including contributions to the common good). These considerations are important when the context is characterized by strong civic values, social norms and habits of cooperation (Lacetera and Macis 2010; Narloch *et al.* 2012). When monetary transfers for inducing more environmentally friendly land use practices are applied in these conditions, we risk eroding intrinsic motivations and other institutions. Although there is a large body of evidence showing that intrinsic motivations and local notions of rights can strengthen community cooperation in governing the commons (Ostrom 1990; Baland and Platteau 1996; Agarwal 2010), we still lack adequate empirical evidence on the particular mix of monetary and nonmonetary incentives needed for the effective conservation of ecosystems, particularly when collective action institutions are involved (Oldekop *et al.* in press). A better understanding of these behavioral and governance dimensions is needed, before we rush to adopt payments as the most appropriate policy option.

### The traps of the compensation logic

The expectation to counteract highly profitable (yet environmentally damaging) economic activities with payments (compensation) may create scenarios where the protection of ecosystems is only possible with increasing levels of compensation due to the increased opportunity cost of conservation. Such scenarios are likely to create unjust and/or very costly outcomes, since the cost of compensation might be considerably higher than the cost of alternative policies (Gregersen *et al.* 2010). This issue is particularly salient in countries where communities or regulatory agencies are unable to provide the necessary compensation to powerful market players. During the last decade, the price of commodities has boomed, increasing the opportunity cost of conserving valuable ecosystems,

while the price of carbon sequestration and other ecosystem services did not follow a similar trend, and it seems unlikely that they will experience a significant rise in the short or mid term (Karsenty *et al.* in press). In Indonesia, for example, palm oil plantations have emerged as an important driver of deforestation. The potential economic benefits of forests allocated to the voluntary carbon market are reported to be much lower than the estimated benefits from oil palm, shedding doubts about the competitiveness of the former (Butler *et al.* 2009). As long as the price of commodities remains high, it is unlikely that PES will be able, by themselves, to stop the current aggressive expansion of the commodity frontiers into natural ecosystems. The conservation of biodiversity would require acknowledging trade-offs between economic efficiency and other considerations, and to recognize that not all opportunity costs can, or should, be compensated. Moreover, when the recipient of payments is considerably wealthier than the local beneficiaries of ecosystem services, compensation raises important equity concerns.

### Avoiding the same mistakes

The outcomes of PES depend on the political, sociocultural and institutional contexts in which they operate. Attention has to be paid to understanding under which conditions PES can make a significant contribution to the conservation of ecosystems, instead of assuming them as policy panaceas. Emphasis is also needed on tackling the ultimate causes of environmental degradation, deeply rooted in power relations and the way in which capital is accumulated and wealth is generated through capitalist markets, which are imbued with structural power inequalities.

During the past two decades we have been lulled into complacency by the allure of "win-win" solutions and we have assumed rather too quickly that simple policy tools (either ICDPs or PES) can solve complex policy problems. This has distracted the attention of policy makers and practitioners from core issues, namely, the quality and effectiveness of rule-making where there are conflicting interests, the validity of assumptions underlying such decisions and how to face trade-offs. We already know that the track record of using panaceas in environmental policy "is one of repeated failures" (Ostrom *et al.* 2007) and therefore we need to avoid making the same mistakes again. Instead, a move to more context-specific policy framing, where payments constitute but one among a diverse set of potential solutions, might prove a more effective way to tackle socioenvironmental challenges.



## References

- Agarwal, B. (2010). *Gender and green governance*. Oxford University Press, Oxford.
- Arsel, M. & Büscher, B. (2012). Nature™ Inc.: changes and continuities in neoliberal conservation and market-based environmental policy. *Dev. Change*, **43**, 53-78.
- Baland, J.-M. & Platteau, J.-P. (1996). *Halting degradation of natural resources. Is there a role for rural communities?* FAO, Rome.
- Bowles, S. (2008). Policies designed for self-interested citizens may undermine 'the moral sentiments' evidence from economic experiments. *Science*, **320**, 1605-1609.
- Bowles, S. & Polanía-Reyes, S. (2012). Economic incentives and social preferences: substitutes or complements? *J. Econ. Lit.*, **50**, 368-425.
- Boyce, J. (2002). *The political economy of the environment*. Edward Elgar, U.K.
- Bromley, D. (1990). The ideology of efficiency: searching for a theory of policy analysis. *J. Env. Econ. Man*, **19**, 86-107.
- Burkett, P. (2006). *Marxism and ecological economics*. Monthly Review Press, New York.
- Büscher, B. (2012). Payments for ecosystem services as neoliberal conservation: (Re)interpreting evidence from the Maloti-Drakensberg, South Africa. *Con. & Soc*, **10**, 28-41.
- Butler, R., Pin Koh, L. & Ghazoul, J. (2009). REDD in the red: palm oil could undermine carbon payment schemes. *Cons. Lett.*, **2**, 67-73.
- Charness, G. & Gneezy, U. (2009). Incentives to exercise. *Econometrica*, **77**, 909-931.
- Christensen, J. (2004). Win-win illusions. Over the past two decades, efforts to heal the rift between poor people and protected areas have foundered. So what next? *Cons. In Pract.*, **5**, 12-19.
- Corbera, E. & Pascual, U. (2012). Ecosystem services: heed social goals. *Science*, **335**, 655-656.
- Corbera, E., Soberanis, C., & Brown, K. (2009). Institutional dimensions of payments for ecosystem services. An analysis of Mexico's carbon forestry programme. *Ecol. Econ.*, **68**, 743-761.
- Engel, S., Pagiola, S. & Wunder, S. (2008). Designing payments for environmental services in theory and practice: an overview of the issues. *Ecol. Econ.*, **65**, 662-674.
- Fehr, E. & Falk, A. (2002). Psychological foundations of incentives. *Eur. Econ. Rev.*, **46**, 687-724.
- Farley, J. & Costanza, R. (2010). Payments for system services: from local to global. *Ecol. Econ.*, **69**, 2060-2068.
- Ferraro, P. & Kiss, A. (2002). Direct payments to conserve biodiversity. *Science*, **298**, 1718-1719.
- Frey, B. & Jegen, R. (2001). Motivation crowding theory. *J. Econ. Surv.*, **15**, 589-611.
- Gneezy, U. & Rustichini, A. (2000). Pay enough or don't pay at all. *J. Ec. Bev. Org.*, **39**, 341-369.
- Gregersen, H., El Lakany, H., Karsenty, A. & White, A. (2010). *Does the opportunity cost approach indicate the real cost of REDD+ ? Rights and realities of paying for REDD+*. Rights and resources initiative. Washington, DC. pp. 24.
- Hughes, R. & Flintan, F. (2001). *Integrating conservation and development experience: a review and bibliography of the ICDP literature*. International Institute for Environment and Development, London.
- Kinzig, A., Perrings, C., Chapin III, F. S., Polasky, S., Smith, V., Tilman, D. & Turner II, B. (2011). Paying for ecosystem services—promise and peril. *Science*, **334**, 603-604.
- Kosoy, N. & Corbera, E. (2010). Payments for ecosystem services as commodity fetishism. *Ecol. Econ.*, **69**, 1228-1236.
- Krall, L. and Gowdy, J. (2012). An Institutional and Evolutionary Critique of Natural Capital. Pages 127-146 in Steppacher, R., Gerber, J-F., editors. *Toward an integrated paradigm in heterodox economics—alternative approaches to the current eco-social crises*. Palgrave-Macmillan, London.
- Karsenty, A., Vogel, A. & Castell, F. (in press). Carbon rights, REDD+ and payments for environmental services. *Env. Sci. & Pol.*
- Lacetera, N. & Macis, M. (2010). Do all material incentives for pro-social activities backfire? The response to cash and non-cash incentives for blood donations. *J. Econ. Psy.*, **31**, 738-748.
- Le Coq, J.F., Froger, G., Legrand, T., Pesche, D. & Saenz, F. (2012). The governance of Costa Rica's programme of payments for environmental services: A stakeholder's perspective. Pages 235-256 in Muradian, R., Rival, L., editors. *Governing the provision of ecosystem services*. Springer, The Netherlands
- Lockie, S. (2013). Market instruments, ecosystem services, and property rights: assumptions and conditions for sustained social and ecological benefits. *Land Use Pol.*, **31**, 90-98.
- McAfee, K. (2012). The contradictory logic of global ecosystem services markets. *Dev. Change*, **43**, 105-131.
- McAfee, K. & Shapiro, E. (2010). Payments for ecosystem services in Mexico: nature, neoliberalism, social movements and the state. *Ann. Ass. Am. Geog.*, **100**, 579-599.
- Miles, L. & Kapos, V. (2008). Reducing greenhouse gas emissions from deforestation and forest degradation: global land-use implications. *Science*, **320**, 1454-1455.
- Muñoz-Piña, C., Guevara, A., Torres, J. & Braña, J. (2008). Paying for the hydrological services of Mexico's forests: analysis, negotiations and results. *Ecol. Econ.*, **65**, 725-736.
- Muradian, R., Corbera, E., Pascual, U., Kosoy, N. & May, P. (2010). Reconciling theory and practice: an alternative conceptual framework for understanding payments for ecosystem services. *Ecol. Econ.*, **69**, 1202-1208.
- Muradian, R. & Rival, L. (2012). Between markets and hierarchies: the challenge of governing ecosystem services. *Ecos. Serv.*, **1**, 93-100.
- Narloch, U., Pascual, U. & Drucker, A. (2012). Collective action dynamics under external rewards: experimental

- insights from Andean farming communities. *World Dev.*, **40**, 2096-2107.
- Oldekop, J., Bebbington, A., Hennermann, K., McMorrow, J., Springate, D., Torres, B., Truelove, N., Tysklind, N., Villamarín, S. & Preziosi, R. (in press). Evaluating the effects of common-pool resource institutions and market forces on species richness and forest cover in Ecuadorian indigenous Kichwa communities. *Cons. Lett.*
- Ostrom, E. (1990). *Governing the commons*. Cambridge University Press, UK.
- Ostrom, E., Janssen, M. & Anderies, M. (2007). Going beyond panaceas. *PNAS*, **104**, 15176-15178.
- Pagiola, S., Arcenas, A. & Plantais, G. (2005). Can payments for environmental services help reduce poverty? An exploration of the issues and the evidence to date from Latin America. *World Dev.*, **33**, 237-253.
- Pascual, U., Muradian, R., Rodriguez, L. & Duraiappah, A. (2010). Exploring the links between equity and efficiency in payments for environmental services: a conceptual approach. *Ecol. Econ.*, **69**, 1237-1244.
- Pattanayak, S., Wunder, S. & Ferraro, P. (2010). Show me the money: do payments supply environmental services in developing countries? *Rev. Env. Econ. Pol.*, **4**, 254-274.
- Pirard, R. (2012). Market-based instruments for biodiversity and ecosystem services: a lexicon. *Env. Sci. & Pol.*, **19-20**, 59-68.
- Polanyi, Karl. (1944). *The Great Transformation*. Boston, Beacon Press.
- Porrás, I. (2010). *Fair and green? Social impacts of payments for environmental services in Costa Rica*. IIED, London, UK.
- Sanchez-Azofeifa, G., Pfaff, A., Robalino, J. & Boomhower, J. (2007). Costa Rica's payment for environmental services Program: Intention, implementation, and impact. *Con. Biol.*, **21**, 1165-1173.
- Sierra, R. & Russman, E. (2006). On the efficiency of environmental service payments: A forest conservation assessment in the Osa Peninsula, Costa Rica. *Ecol. Econ.*, **59**, 131-141.
- Spash, C. (2011). Terrible economics, ecosystems and banking. *Env. Val.*, **20**, 141-45.
- Titmuss, R. (1970). *The gift relationship: From human blood to social policy*. John Ashton, London, UK.
- Van Wilgen, B.W., Le Maitre, D.C. & Cowling, R.M. (1998). Ecosystem services, efficiency, sustainability and equity: South Africa's Working for Water Programme. *T. Ec. Evol.*, **13**, 378.
- Vatn, A. (2010). An institutional analysis of payments for environmental services. *Ecol. Econ.*, **69**, 1245-1256.
- Wells, M. & Brandon, K. (1992). *People and parks. Linking protected area management with local communities*. World Bank, Washington.