

## Can Payments Improve Environmental Services on Farmland?

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### Environmental services on agricultural land

Agriculture is the basis for livelihood activities of 40% of the world's population and occupies 40% of total land area; 90% of the farms worldwide have a size of less than two hectares (IAASTD 2008, p.2). Smallholder farming can therefore critically affect the global ecosystem. With environmental integrity prominent on the global political agenda, the world community is looking for a form of agriculture that supports biodiversity and other environmental services (FAO 2008; Scherr et al, 2009; UN 2009). Payment for Environmental Services (PES) is often mentioned as a major innovation in this regard (Diaz et al 2005; FAO 2008; UN 2009).

In the current PES debate, the focus is not centrally on agriculture itself: farmers are instead involved in delivering off-farm services in forests, re-greening degraded land, maintaining trees along rivers, and so forth. This paper focuses on the possibility of PES mechanisms to support family farms in the South in changing their agricultural practices on arable land, where the core of farming activity takes place.

### Background to the Gafsa Oasis

Gafsa Oasis, Tunisia is a well documented pilot for the Food and Agricultural Organisation's (FAO) Globally Important Agricultural Heritage Systems (GIAHS) programme (FAO 2009). Gafsa is situated in the mid-west of the country on the northern fringe of the Sahara desert, with an estimated 250mm of annual rainfall. In Gafsa, mountains collect rainwater forming an oasis in the downstream valley; originally the oasis was 700 hectares, but with water pumping the area has increased by fivefold. It is one of a few oases in the area where the landscape is dominated by rocky mountains, sandy dunes, and savannah crossed by seasonal rivers.

This paper presents a single case of an extensive study amid a package of activities to preserve the oasis, involving local farmer organisations, NGOs, the local Government and business community. Local authorities and NGOs assume that farmers have forgotten traditional methods and need training and awareness-raising to motivate farm workers to restore these practices. We interviewed key informants and farmers,

participated in workshops with local NGOs and walked across the oasis, where we found that in some places the traditional three-layer cropping system was intact, and in others the diverse system was destroyed and the land polluted or encroached with (illegal) building. Out of the multitude of stories and cases we came across, we highlight two families working on rather contrasting sites to unveil mechanisms by which farmers do or do not deliver environmental services.

### A "multi-cropping" farming family

The farmers to the left of Figure 1 (A) derive their practices from traditional methods with three layers of production: palm trees in a 50-100 years' cycle; fruit trees in a 5-15 years' cycle, and annual crops. The combined cropping layers under the closed canopy make optimum use of water and land, and the production method is labour-intensive: individual plants need nurturing in niches where they fit best, and annual crops are planted in between fruit trees. Tree management is also specialised: different fruits require complicated fertilisation methods. The family consumes part of their produce, but mostly they sell fruits and vegetables on the local market. These "traditional" farmers were immigrants into the oasis. They have leased this land for twenty years from a local family whose children left the farm to live and work in the cities.

### A "mono-cropping" farming family

The farmer to the right of Figure 1 (B) employs a different strategy. The family has been staying on this particular plot for a few months only, taking the place of other families who each stayed for less than a year to take care of the house of the landowner, who left the oasis for the capital. It uses water allowances to grow annual crops such as salads for the local market. In order to create space, the farmer removed fruit trees. This immigrant family has few lease rights: the landowner avoids long-term tenure as after some years, tenants would be in a position to legally claim tenure rights. Formally, the minimum lease period is three years, but the authorities do not enforce this rule. Hence the tenants' position: "We have no interest in maintaining trees: they are not productive in the short term. In order to get rewards for guarding the land, we must grow annual crops." The tenure practice motivates this farmer to grow crops that pay fast, and to destroy palm and fruit trees and agro-biodiversity.

### Delivering environmental services from agricultural land

The comparison provides a few useful insights: Farming can deliver a variety of environmental services. Even though they are immigrants, the multi-cropping family employs local agricultural traditions, dynamically conserving local knowledge of ecology. These practices stabilise the soil, make judicious use of water, and bind carbon. Multi-layer cropping systems are likely to create resiliency to climate change, because a mixture of crops spreads risks and reduces transpiration of scarce water. Similarly, the traditional system provides biodiversity (different crops in different layers, habitat for non-agricultural flora and fauna), including agro-biodiversity (some crops were traditional, others improved stocks). It also provides landscape beauty and shade to town inhabitants.

Securing long-term production is the main driver for a system that provides environmental services. The multi-cropping farming family delivers these services as part of an optimum production system, not as a response to any ideological or external stimulus (see also Van der Ploeg 2008).



Figure 1. Two oasis farmer families with distinct practices. The (A) family employs a mixed cropping system. The (B) family grows annual crops only. The first family has a long, the other a short lease arrangement. Photos: Frank van Schoubroeck.

The tenant decides on day-to-day decisions; the landowner sets the tenure arrangements. In the above examples, it appears that formal landowners have a marginal say about direct interventions in the agricultural system. Both families are immigrants. The family with the long-term lease contract replicates traditional farming methods that provide sustainable environmental services. The family with a short-term contract is in no position to invest in different crop layers. Hence, the tenants decide on the farming system and determine delivery of environmental services (Wunder 2005), whilst landowners provide the wider conditions in which tenants can optimise economic and ecological benefits - or not.

Regulation has marginal impact if not enforced. Short-term tenure is forbidden by law; yet, this rule is not enforced - with disastrous results to agricultural ecosystems.

### Considering the impact of direct monetary incentives

With a theoretical experiment, we can evaluate how the two farming families might respond to different monetary incentives.

#### 1. Direct payments and subsidies

An example of the “direct payment” mechanism is the process of paying farmers for the planting or maintenance of trees. The oasis is a place for recreation for citizens and tourists, so Gafsa town could make funds available to directly pay farmers to maintain the oasis landscape. However, neither family owns the farmland nor do they have formal land titles. Subsidies are likely to reach the formal landowners and redirection of these funds would depend on voluntary arrangements between landowners and tenants. Commanding and monitoring such arrangements and the effects on the number of trees would be difficult. It is conceivable that, in order to obtain subsidies, the landowner would review the arrangements with tenants to maintain cropping layers, even if it could mean losing some control over tenure rights.

#### 2. Market-friction reduction: eco-labels

With market-friction reduction you “brand” a product for particular (environmental, cultural, health) qualities so that consumers buy both a product and sustainable production methods. Such mechanisms exist widely for organic and fair trade products. Buyers of environmental services are consumers; governors of such systems are NGOs that set and regulate standards (Ruben 2008). This traditional production system could be branded. Someone would need to set and monitor criteria, and make them known to farmers and consumers. Considerable investments would be required to realise such a system. Alternatively, oasis farmers could try to become part of the organic or fair trade labelling systems. In the Gafsa setting, both farmers could benefit from such a scheme. For tenants with long-term land rights it would however be easier to build a long-term relationship with the governor of the system or traders. We can conclude that linking environmental services to existing (fair trade, organic) labels is a possible means of supporting long-term tenants.

#### 3. Rewards and compensations: tax mechanisms and tradable permits

Further financial rewards and compensations are tax mechanisms (e.g. tax holidays for not polluting or conservation) and tradable permits, of which the working principle is that “the polluter pays”. These demand a strong monitoring system that collects data to impose or reduce taxes accordingly, for example, assessing the number of trees through aerial photography. Yet, even if there were a strong governing actor, tax and permit mechanisms are likely to be directed towards legal landowners, and not to informal tenants. As we found that landowners can violate the rules with regards to tenant arrangements, it would take quite drastic institutional development to organise tax mechanisms sufficient to stimulate provision of environmental services.

## Conclusion and discussion

From an environmental point of view, PES can stimulate and institutionalise sustainable environmental practices in farming systems. However, the key person to realise environmental services is the actual farm worker, whether s/he is the formal land owner, a long-term or a short-term tenant. Thus, for an effective PES mechanism, one needs to develop a plausible relationship between the payments and the farmers who deliver environmental services on the ground.

For a decision-maker in the Gafsa Oasis, it is questionable if setting up PES mechanisms would be the best investment in realising environmental services. As we have seen, at present farmers realise such services as a side-product of production, provided that they are in a position to build up the farming system from within a long-term perspective. This observation is in line with the theory of Van der Ploeg (2008) who explains that it makes economic sense for peasant farmers to invest in a rich ecology and a growing flow of germplasm, nutrients and water on their farm and therefore produce a variety of environmental services. Possibly, the best way to invest in these services is therefore to create conditions by which farmers can optimise their farming system, starting with securing long-term tenure rights.

PES-like mechanisms might further support farmers to deliver environmental services if they take into account the individual positions of farmers. Payments or tax reduction may support farmers, but are more likely to be effective if they streamline the relationship between tenants and landowners. The same counts for labelling mechanisms. In fact, a close study of different types of relations between farmers, tenants and land owners is necessary for any monetary incentive to have the desired effect. This is in line with Wunder (2005) who states that not the *de jure* land rights but the *de facto* control capacity is decisive for a PES scheme. In a closed oasis, targeting tenants with long term land rights will provide more ready benefits than tenants with shorter term arrangements.

The necessary institutional arrangements are more likely to be present in the North than in the global South, which explains why few farmer organisations in the South support the idea of PES for securing environmental integrity (Haddad 2009). It may therefore be a more effective investment to look into the reasons why farmers produce environmental services, and consider payments as one of the many options - besides the realisation of rights (to land, to water, to markets, etc.) or capacity building. The presence of a PES scheme is often a catalyst to achieve other benefits such as the strengthening of property rights, because farmers become visible on the local political agenda (Grieg-Gran et al. 2008). Buyers of environmental services can then support the realisation of such rights.

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