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Case studies on Remuneration of Positive Externalities (RPE)/ Payments for Environmental Services (PES)

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In order to address the risk of nitrate contamination caused by agricultural intensification in the aquifer supplying its mineral water, Nestlé Waters, the world leader in the mineral bottling business financed farmers in the 6000 hectares Vittel catchment to change their dairy farming system.

The PES program was later extended to contiguous aquifers in the Vittel area and now covers 10,000 hectares.

The Vittel Case: A public-private partnership in the mineral water industry

Overview

Concerns about the increasing trend in nitrate rates were raised in the early 1980's. This posed a serious risk for the producers of 'natural mineral water, a profitable and very competitive business. French legislation on the quality of "natural mineral waters" is very strict and, unlike in other countries such as the United Kingdom or the United States, prohibits any treatment.

In response to this increasing risk of nitrate contamination, Nestlé Waters, an important employer in the region, thanks to the production of Vittel natural mineral water and thermal tourism, proposed to farmers in 1988 to transform their intensive dairy farming system into extensive, hay-based dairy farming with no pesticides and chemicals. In response to the reluctance of farmers to adopt the suggested changes, Nestlé Waters decided to take the initiative and develop a set of incentives to encourage farmers to permanently change their farming practices.

The objective of the PES program was to provide a high level of water quality, specifically nitrate rates below 4.5mg/l in the aquifer. This required maintaining a rate of 10mg/l in the root zone of the plants, which is achieved by reducing fertilizer use, animal waste and manure application and making use of the capacity of the soil to absorb nitrates.

The buyer of the ecosystem service is Nestlé Waters, through its intermediary Agrivair. Sellers are the 37 farmers active in the catchment when the PES programme was first implemented.

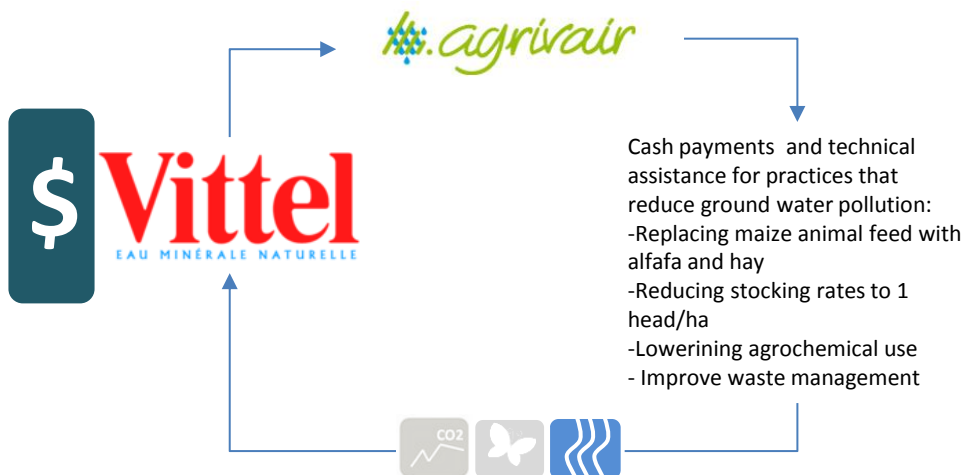


Figure 1: Schematic diagram of the key roles

Background

The Environmental Challenge

In the Vittel catchment, as in many places in France and in Europe, the traditional hay-based cattle ranching system had been replaced by a maize-based system. Free range was limited while stocking rates increased. The increased nitrate rate was caused primarily by the heavy leaching of fertilizers from the maize fields in the winter when fields are barren, as well as overstocking and poor management of animal waste. Pesticide use was also increasingly becoming an issue.

A Corporate Response

Once Nestlé Waters became the majority shareholder in The Vittel Company in 1987, it started to discuss the environmental problems and their possible economic impact with farmers and eventually took the initiative to introduce a private-sector led PES programme. The decision to address the challenge by means of a PES scheme was taken because public incentives for farmers to change their agricultural practices were missing. However, the impairment of the water quality would have eventually led to the closing down of the natural mineral water business in the region that would also have affected the local economy, including local farmers. The local public sector as well as Nestlé Waters had an interest in avoiding this scenario in view of the potential loss of revenues and employment. Relocating the business to more untouched catchments elsewhere was not feasible because of the value of the Vittel label that ensured a premium price on mineral water.

Milestones

Once the cause of the environmental problem has been identified measures were taken in form of a PES-type programme to tackle the challenge effectively..

In 1989, a partnership with the French National Institute for Agronomic Research (INRA) was established and a four years multidisciplinary action research programme was launched to identify, test and negotiate the optimal farming practices necessary to reduce the nitrates and design a set of incentives that is sufficiently attractive to encourage adoption by all farmers in the catchment.

In 1992, a major step was taken when Nestlé Waters created “Agrivair”, an intermediary responsible for negotiating and implementing the programme. It took more than 10 years, from 1992 to 2004, to move from experimentation to negotiation and adoption by individual farmers.

By 2004, 92% of the sub basin was protected and all farms remaining in activity had adopted the new farming system. Between 1988 and 2006, the number of farms declined from 37 to 26 while the average farm size increased to 150 hectares as the extensive production system required additional land and marginal farmers sold their land to Agrivair.

Several reasons led to the successful establishment of PES in Vittel, all of them necessary but not sufficient.

1. A constraining legislation for natural mineral water prohibiting water treatment;
2. A lack of alternatives to reduce nitrate levels;
3. A small number of farmers to limit transaction costs;
4. A multidisciplinary and participatory, “learning by doing” research action programme that took into account farmers’ livelihood strategies over the long run
5. The assurance of acceptable farmers’ income levels at all times
7. Clear win win situation for a large set of stakeholders because Vittel is a major employer in a region where unemployment is high
8. The establishment of Agrivair as a trusted local mediator and business partner in the implementation process
7. The development of a shared vision as the basis for a set of innovative partnerships that enabled buy in, successful participation and cost-sharing with a variety of key stakeholders

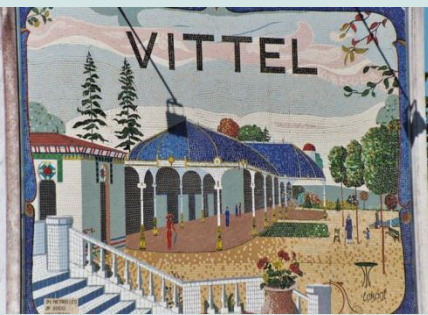


Figure 2: Billboard welcoming visitors to the spa town of Vittel

Source: D. Perrot-Maître

Figure 3: Location of Vittel, France

Source: <http://www.riondesa.fr/images/plan/map-france.gif>

Figure 4: Agrivair celebrates 20 year of PES agreement- read the press release at

[http://www.nestle-](http://www.nestle-waters.com/media/featuredstories/agrivairq-celebrates-its-20th-anniversary)

[waters.com/media/featuredstories/agrivairq-celebrates-its-20th-anniversary](http://www.nestle-waters.com/media/featuredstories/agrivairq-celebrates-its-20th-anniversary)

Improving ES provision in cattle ranching

Conditionality

To benefit from the program, farmers must:

1. Give up maize cultivation for animal feed (land under maize production shows nitrates rates of up to 200mg/l in the root zone).
2. Adopt extensive cattle ranching including pasture management (hay and alfalfa rotation so that farms produce all animal feeds themselves)
3. Reduce carrying capacity to a maximum of one cattle head per hectare (in exchange, farmers are given additional farm land to compensate for the loss)
4. Compost animal waste and apply optimally in the fields
5. Give up agrochemicals (chemical fertilizer replaced with composted manure, no pesticides)
6. Balance animal rations to reach optimal milk productivity and farm profitability
7. Modernize farm buildings for optimal waste management and storing

In exchange, farmers sign a 18 to 30 years contract with Agrivair by which:

1. Their land debt is abolished and land acquired by Vittel is left in usufruct for up to 30 years and farmers have additional land to farm (a necessary condition to compensate for the lower stocking rate)
2. Farmers receive a subsidy (on average about 200 euros/ha/year during five years equivalent to 75% of disposable income). This is to ensure a guaranteed income during the transition period and reimburse the debt contracted before entering the program, for the acquisition of farm equipment. The exact amount is negotiated for each farm.
3. Farmers receive up to 150,000 euros per farm to cover the cost of all new farm equipment and building modernization
4. Agrivair pays farm labourers to apply compost in farmers' fields every year. This is to address the labour bottleneck and ensure optimal amounts are applied on each plot
5. Free technical assistance is provided for the creation of the annual individual farm plans and to facilitate the introduction into new social and professional networks. This is particularly important as giving up the intensive agricultural system means that farmers are no more part of traditional farming networks and support organisations such as the Farmers Federation and the Chamber of Agriculture.

Detailed terms of contracts such as time horizon, guaranteed income during the transition period and farm equipment investment were discussed with each farm and adapted accordingly.

To ensure compliance, Agrivair monitors the farming practices, the livestock stocking rate, the good use of new building facilities (ensuring animal waste is properly disposed of) and reviews all farm accounts, a specific right explicitly stated in the PES contract. Until 2004, when chemical inputs were no longer applied in the farms and farming system had been radically modified, INRA monitored the nitrates levels in the soil all year around across 17 sites across four soil types and two types of farming systems. Water quality is monitored daily by Nestlé Waters laboratory in Vittel.



Incentives



MRV

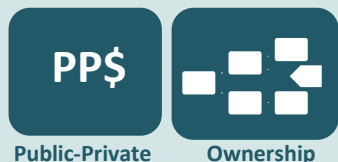
At first farmers were opposed to the program and the main challenge faced by Nestlé Waters Inc, was how to transform a conflictive situation into cooperation and convince farmers it was also in their interest to change their production system.

The dialogue between the farming community and Vittel was initiated in 1989, through the establishment of a research program with INRA. Farmers were invited to participate in the research program and work with the researchers on identifying acceptable conditions for a new production system.



Figure 5: Farming landscape in Vittel catchment (Photo: D. Perrot-Maître)

Evolution of the agreement



Agrivair has become a champion of environmentally sustainable local development, conveying the vision of “water as a patrimonial good” and catalyzing the creation of environmentally-minded local businesses and transferring its business skills and experience (for example through the co-foundation of “Terre Eau”, a Think tank association open to public and private stakeholders that provides support for project management and innovative start ups).

It has also become a generator and enabler of local economic development in the area.

Bundling biodiversity and water quality and enhancing brand name

Agrivair has become increasingly involved in the development of biodiversity-related activities favourable to integrated pest management and the reduction of chemical inputs on farms. Ladybirds, a natural predator of crops pests, are bred in Agrivair laboratories and released at strategic times during the year. Agrivair financed and worked with farmers to plant and maintain 40 kms of hedgerows to keep a balanced population of foxes and birds of prey (the natural predators of field mice that ravage crops). Biodiversity is also encouraged through the planting of flower rows and the establishment of bird houses and bird refuges. Biodiversity, especially insects, bird populations and diversity of wild flowers are regularly monitored.

Developing further a “green” image for the brand and the territory where it originates, has become a key marketing strategy and biodiversity is heavily contributing to it. Agrivair collaborated with the certification institute Veritas to design and pilot a business to business biodiversity label (“Biodiversity Progress”) that recognizes the integration of biodiversity into private sector operations and strategy. The label, the first of its kind, was launched in March 2013 and awarded to the Vittel territory, contributing further to the environmental reputation of the area and its water. The Vittel mineral water becomes the first mass consumption product to originate from a certified geographic area. Biodiversity in the Vittel area is now comparable to what is found in protected areas. Restoration of aquatic ecosystems has become one of the priorities of the regional Water Agency. Recently, Agrivair collaborated with the Agency to restore the Vittel river.

Agrivair attempted to introduce organic dairy farming but did not succeed because of the difficulty to market organic milk on a small scale (Interview with Agrivair Director, June 2013). More successful are the 40 hectares of organic apple orchards planted by Agrivair, the product of which is sold directly to Nestlé for baby food.

Expanding into new sectors

Following the success of the programme with dairy farmers, Agrivair expanded and adapted it to the adjacent Contrex and Hépar aquifers where forest is the dominant land use. To maintain groundwater quality in the catchment, Agrivair also had to respond to the rapid urbanisation in the area and expand its programme outside the farming community. Agrivair now manages forests around the adjacent Contrex springs, 300 hectares of city parks, 200 hectares of golf courses, a horse racing track, and the Vittel thermal park. The use of agrochemicals has been banned for the maintenance of railroad tracks, school grounds, airport grounds, parking lots and paths. Moreover, the Vittel municipality is collaborating with Agrivair to collect and recycle all dangerous urban and industrial wastes. Agrivair is also actively promoting the substitution of oil heating for gas in residential housing and has developed new building standards in the area. Although they cannot be considered PES, these measures (like the biodiversity-related activities) are a necessary complement to ensure groundwater water quality. Without them, the PES programme on dairy farms, although successful to control nitrate pollution, would become irrelevant as other sources of pollution now threaten water quality.

Agrivair, champion of environmentally sustainable local development initiatives

To ensure water quality, the PES had to evolve from a farming system-focused programme to a programme including urban and industrial sectors. An observation network monitors all activities in the catchment area to quickly identify pollution risks and preventive measures are taken when required. Agrivair is catalyzing innovative investment partnerships for joint ventures in sustainable businesses. In the energy sector for example, a partnership was established between the National Agency for Environment and Energy (ADEME) and Verdesis, a subsidiary of a branch of the French Electrical Company (EDF) in charge of developing renewal energies. Verdesis is investing 10 million € in a biomethanization plant to recycle animal and plant waste and provide alternative sources of energy in the area and additional income to farmers. Biomethanization is one of the renewable energy alternatives where France is lagging behind and this new project is an important contribution to implement France new energy policy.



Figure 5: Hedgerows planted by Agrivair
(Photo: D. Perrot-Maître)

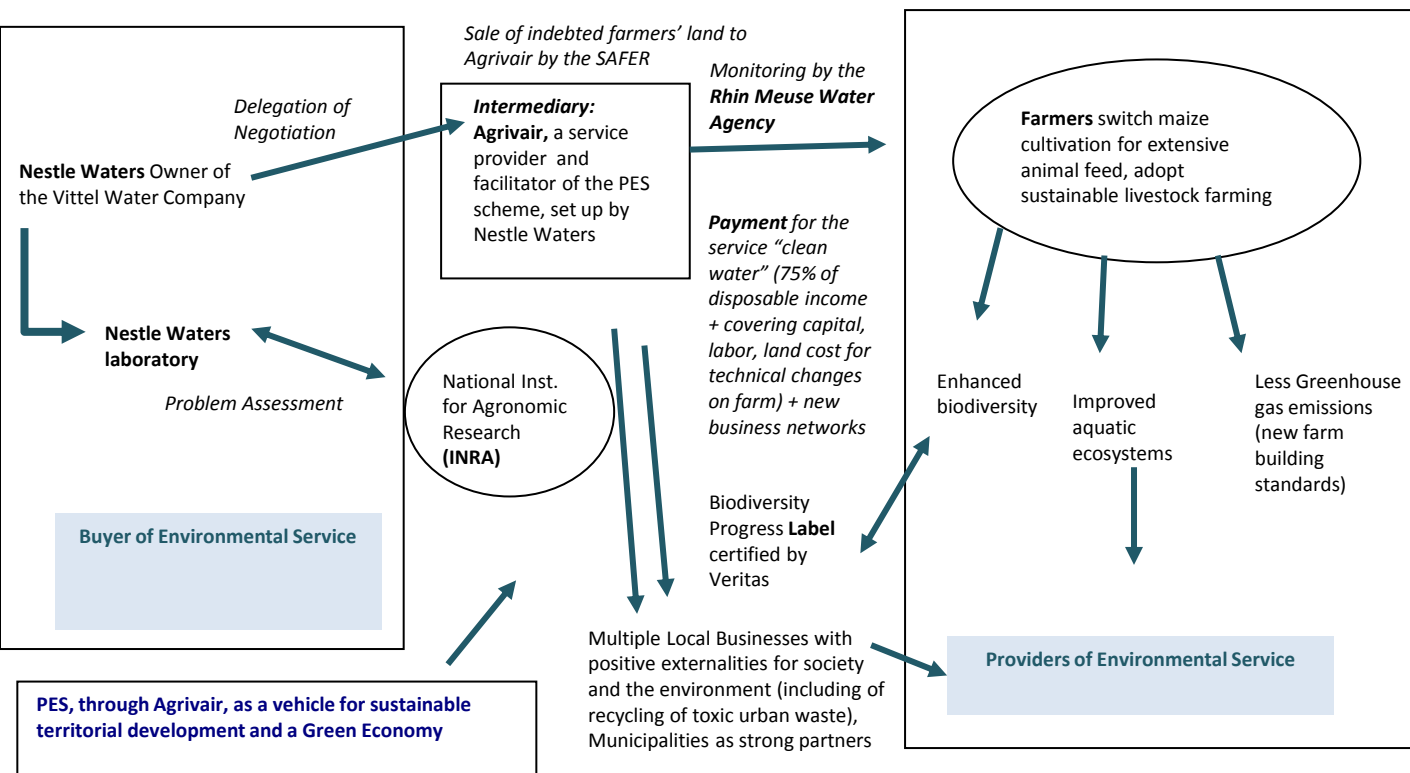
Key partners and collaborators

Partners and collaborators reflect the evolution of the PES programme. In the early days, key partners included the INRA, the national Institute for Agronomic Research, and the Rhin Meuse Water Agency, both public institutions. Collaboration with the INRA was essential to the scientific design and negotiation of the PES. INRA had just developed a new and innovative multidisciplinary farming system research division and Vittel provided an excellent opportunity to develop the research programme.

Another key actor (although not a partner) was the local Société d'Aménagement Foncier et d'Établissement Rural (SAFER), a private institution created by the public sector to intervene in farmland market. The SAFER was first opposed to selling farm land to a multinational company but eventually accepted. Being able to acquire land and control its use was a key element in the bargaining process with farmers and the success of the PES. The National farmers Federation (FNSEA) and the Chamber of Agriculture were also reluctant to change and influenced the negotiation process. Although these institutions are not strictly speaking partners or collaborators, they were very influential in the choice of a PES and the lengthy negotiation process.

As the programme extended to the adjacent Contrex and Hépar springs with different land uses, and addressed local development issues outside the agricultural sector, new partners and collaborators joined the effort. The National Forest Office (ONF)- the national railroad company (SNCF-which adopted thermal weeding on the railroad tracks) and all eleven municipalities, well aware of the likely impacts of declining groundwater quality on local development, employment and taxes.

Figure 6: Key partners in the PES mechanism in Vittel



The logo consists of the letters 'PPS' in a white, bold, sans-serif font, centered within a dark teal rounded square.

Public-Private

Costs and financial sustainability

The program is financed primarily by Nestlé Waters Inc. through its support for Agrivair .

A study published by INRA in 1997 estimated that over the first seven years, Nestlé Waters spent over €24.25 million (INRA 1997; Agence de l' eau 1999). Of these, €3.81 million were spent on farm equipment, €11.3 million on farm financial compensation and 9.14 million on land acquisition (INRA-SAD-VDM 1996). Land acquisition can be considered part of PES considering that the acquired land was returned to farmers in exchange for adopting the new farming system. In terms of costs associated with the design and evaluation of the scheme, INRA assumed 50% of the research costs to identify the optimal farming practices, Vittel S.A, 33% and the Water Agency Rhin Meuse 17% (INRA, 1996 cited in OECD, 2005, p. 88). The Water Agency paid for 30% of the monitoring expenses of the new farm buildings (to ensure adequate disposal of animal wastes). Agrivair pays for 70% of building monitoring costs, costs of monitoring solids for nitrate and pesticides between 1987 and 2004 and 100% of water monitoring costs since 2004.

No detailed information is available for the post 2004 period. It is fair to say that the bulk of the expenditures occurred early on when large investments had to be made and farmers had to be compensated for the loss of income during the transition phase. The Agrivair budget, about two million Euros a year, including salaries for staff of 13 (to provide technical and labor support to farmers including 23% of the overall seasonal work on farms) and amortization of land purchase over 20 years can provide a global estimate of the actual costs to Nestlé Waters (Personal communication with C. Klotz, Agrivair Director, 3 May 2013).

This budget however reflects the expansion of Agrivair's role in the region and covers activities in the agricultural, urban and industrial sectors, in the Vittel, Contrex and Hépar aquifers. Although there is no detailed budget information, a possible hypothesis is that as the transition to a new, and profitable farming system was completed, the budget share for direct incentives to farmers declined while the share for activities outside the farm sector, including research for technological innovation or prospective analysis, increased.

A Cost sharing strategy

Many PES programs are limited by their inability to provide sustainable financing. The Agrivair budget is primarily alimented by Nestlé Waters Vosges. At present, Agrivair is not engaged in selling advisory "green" services to local stakeholders as previously envisaged but this could become an option in the future (Personal Communication with C. Klotz, Agrivair Director, 3 May 2013).

In this case, what is particularly innovative is the way the costs of aquifer protection are shared with key partners and collaborators. For example, the national railroad company and the managers of city parks and golf courses agreed to pay the extra cost (about double) associated with green management while municipalities embarked on (and paid for) ambitious recycling program. Collaboration and partnerships were the direct outcome of a shared vision for sustainable local development, actively led by Agrivair, and which highlighted how protection of water quality led to a win-win scenario for all sectors of society.

The replicability of the Vittel experience is limited but the approach can be replicated and adapted.

A Vittel-like scheme is too costly for public institutions to be replicated but the approach (establishment of a diagnostic, convening of key actors and concerted action) can be replicated and simplified to reduce costs- (Personal communication with M. C. Klotz, Agrivair Director, 3 May 2013).

The sophisticated approach seems to be more appropriate for large catchments where radical changes in farming systems are required but, there again, high transaction costs could limit its applicability.

The French Ministry of Health, for example, opted for a command and control approach to achieve results quickly (Personal communication with Jean Marc Vauthier, Agence de l' Eau Rhin Meuse, 14 juin 2013).

Implications for EU policy

The Vittel case illustrates the lack of coherence between the agricultural policy and the water policy in Europe, incoherence pointed out by the OECD (2011).

The new European agricultural policy decoupling the first and second pillar and the new set of agro-environmental measures are a welcome step in the right direction. Payments for Watershed Services, through agro-environmental schemes in the Common Agricultural Policy, are increasingly gaining attention in Europe as viable alternatives to command and control policies and state-led or NGO-led PES (Stanton et al., 2013). In contrast to traditional EU subsidies which were attributed on a yearly basis, farmers must commit to adopt environmentally friendly agricultural practices for at least five years. But so far the conditionality of these measures has been unclear and their performance limited. Propositions for a post 2013 agricultural policy that seek to link agro-environmental subsidies to the provision of additional ecosystem services such as biodiversity, water quality and climate regulation, is a step in the right direction. .

There is no evidence that the Vittel experience influenced French water or agricultural policy but it is inspiring action at local level.

The experience clearly shows is that a shared vision of development, buy in of all sectors and coherence between sectoral policies is a necessary condition for long term success. Joint investment and cost sharing, capacity building and transfer of skills and experience are all necessary to implement this vision and maintain the relevance, effectiveness and sustainability of PES and agroenvironmental measures. Local and regional champions are fundamental to promote change. Yet, a Vittel-like approach implies long term engagement, a requirement that does not fit well with short term political time horizons and dwindling local budgets.

Who will therefore catalyze a shared vision of local development and the essential partnerships and joint investments for its implementation? Integration of the Water framework Directive and the EU agricultural as well as energy and development policies is necessary. The French Chambers of agriculture (in charge of implementing the EU Common Agricultural Policy's agroenvironmental measures) and the Water agencies (in charge of implementing the Water Framework Directive) coordinate their actions to some extent. But it is also necessary to further integrate the implementation procedures and scales (national level and top down implementation of the agroenvironmental schemes by the Chambers of Agriculture, concerted action at watershed level by the Water Agencies to implement the Water Framework Directive) and reflect on the role of the various stakeholders, especially public territorial institutions (municipalities, department, region) in shaping local development and spearheading a shared vision of sustainable development.

The private sector has an essential role to play as well, transferring business skills and capacity, and forge partnerships around a shared development vision. An OECD report (2005) arrived to a similar conclusion, stating that in the presence of market failure, to protect the multifunctionality of agriculture, private transactions and voluntary approaches were more efficient, effective, equitable and sustainable than government approaches and needed to be encouraged with governments actively supporting them.



Public-Private



Ownership

Ten years (including four for research) were necessary to complete the bargaining process and convince all farmers. This was due to essentially the heterogeneity of farming situations, and the difficulty in reaching agreement on how to value the cost of changes and the size of compensation (for more details, see Perrot-Maître 2006).

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Lessons Learned

A shared vision and an innovative set of key Partners is essential. The creation of an intermediary institution located in the midst of the farming area acted as a catalyst to build rapport and partnerships. Reaching out to key public sector institutions and municipalities enabled buy in from local and regional governments and cost sharing essential to the financial sustainability of the programme.

Success is more likely when local development clearly relies on environmental quality. Clear win-win situation improve the likelihood of success. This is more likely to be achieved in smaller areas (or where aquifers are small) and where development trade offs are limited.

Success is never ensured. Constantly learning, experimentation and adaptation are required. Context changes constantly and new threats and challenges require constant innovation. The programme must be ready to revisit farming contracts, diversify agricultural production, identify new revenue generating alternatives, forge new partnerships, catalyze new investments, and develop new strategies and practices. As a result, a significant (unspecified) and variable share of Agrivair budget is allocated to research and forecasting activities.

The agricultural PES scheme is not sufficient to maintain water quality and must be complemented with other measures and investments that integrate a broader and coherent development vision. Intermediary institutions such as Agrivair, must be ready to play a catalyst and conveying role if necessary and build other stakeholders' capacity when necessary.

Sustainability and new challenges

Successful establishment and good results so far do not ensure long term success. At present, Agrivair is facing two new challenges. As cereal prices are skyrocketing and prices of milk declining, the opportunity cost of virtuous dairy farming is increasing and farmers are pressing to revise their contracts and use pasture land for cereal production. Further negotiations are needed and new research required to revise the contractual arrangements and practices that ensure groundwater quality.

Another pressing challenge relates to the reputation risk caused by a recent report from the influential French national consumers association, "60 millions de consommateurs", which analyzed pesticides levels in bottled water in France and concluded that 10% of all sampled bottled waters, including in Vittel, contained residues of pesticides, herbicides (banned since 2001) or drugs. Although doses are infinitesimal and do not pose any health threat, the bottled water industry is an extremely competitive sector and these results can affect brand reputation, consumers demand and business profitability. To which extent this can affect Nestlé Waters' capacity to maintain the PES scheme and its relevance as a priority is not clear. But this clearly points out the fragility of success and the high reputational risk in the industry.

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