



Woodlands for drinking water : the value of forest services

« You could do worse but it costs more »

Households would be prepared to pay up to 50€ extra per year for tap water from woodland sources, and the more woodlands we have, the cheaper the water. These two results clearly show the value of forest services.

Maintaining plant cover and soil protection, extensive management, low nitrates in the water leaching into the ground, purifying functions and natural image: foresters have every reason to take pride in their role in preserving clean drinking water resources – a role that deserves to be given greater prominence.

“ Forests and Water ” – a joint INRA/CNPF¹-IDF project

With “ payments for environmental services ” high on the agenda, private foresters (with the French Federation of Private Foresters - FPF) have realised that there is a need for an economic evaluation of forest services to clean water supplies. The INRA and CNPF-IDF therefore decided to launch a joint project called “ Forests and Water ”, whose purpose is to develop methods capable of producing reliable economic figures on the environmental services rendered by forests. This leaflet describes the main results of a 3-year project combining research and studies in pilot sites.

1. Centre National de la Propriété Forestière: a public institution in charge of private forest development in France.

Forests protect water quality, and foresters can help to preserve it.

Forests have a positive impact overall on water quality, for two main reasons:

- Because of the particular way that forest ecosystems function;
- Because forest management can limit the adverse effects of activities such as phytosanitary applications, fertilisation, soil stripping or sealing, and so on.

Forests protect water

The most significant effect of forests on water quality become apparent relatively to other potentially more harmful land uses. To give an idea for nitrates (fig. 1) and herbicides:

Herbicides are used 450 times more frequently² for cereal crops than in forests.

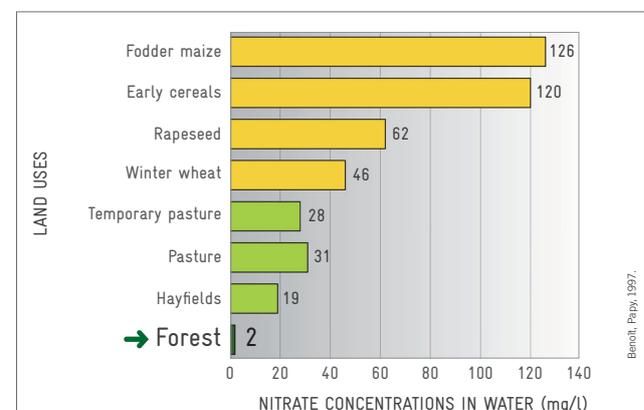


Fig. 1: Nitrate concentrations in water in the rooting zone (at a depth of 1.10m) for different types of land uses in Lorraine.

2. Based on treatment frequency indexes: number of standard doses applied to a plot during one agricultural season. Sources: IDF from Gama et al. 2006 - Ecophyto R&D 2010).

How foresters can help to protect water

Remember, the high overall standard of woodland water does not necessarily mean that its quality remains constant in space and time.

The time factor is crucial, because drinking water supplies have to be up to standard on a daily basis.

Woodlands help to protect water resources, but they have to be cared for to make their protective role as effective and enduring as possible (Ferry, 2004). Foresters can enhance the protection of water resources by taking various precautions in their felling operations.

> Technical and economic references

LOCAL AUTHORITIES CAN PROVIDE FUNDING TO ADAPT WOODLAND MANAGEMENT ABOVE WATER CATCHMENTS

The site at Masevaux (Upper Rhine) is a good example of how woodland management can be adapted to protect mountain spring catchments. Activities are already under way and the real additional costs for drinking water have been measured at 33 to 75 €/ha.

| Forestry activities dedicated to drinking water protection | Additional management costs |
|---|-----------------------------|
| <ul style="list-style-type: none"> – clearing brush above water catchments – cable logging of windthrown trees – biodegradable chainsaw oil – more use of cables for felling – “woodsman kits” to deal with accidental pollution | 33 €/ha/year |
| <ul style="list-style-type: none"> – recommendations as above with cable logging in general use in protection areas around water catchments (fig. 3) | 75 €/ha/year |

These measures are being taken in response to clear expectations from the water authorities, and their costs cannot be met by private forest owners. The situation here is very simple, as the municipality itself is directly responsible for water management (there is no delegation to a private company) and also owns the woodlands feeding the water catchments, with the ONF³ in charge of forest management. This example shows that a municipality can provide funding for preventive action in woodlands to protect its water catchments. It would therefore be entirely possible to consider agreements on measures of this kind with private foresters, on a contract basis.

3. Office national des forêts: a public institution in charge of managing public forests in France.



A woodland planting to protect a water catchment near Rennes.

> Technical and economic references

CREATING WOODLANDS TO PROTECT WATER

Objective: to capture the benefits of water resource protection by forests.

Many local authorities have already been investing in woodland plantings in zones that are especially vulnerable to pollution. These woodlands have two roles:

- in areas that generate high-quality water, they will, at the very least, dilute any pollution;
- if the active rooting zone has any access to polluted water, they act as a purifying filter.

The Rennes municipality has carried out an exemplary project, creating over 70 ha of woodland around one of its water catchments. The cost of establishing these woodlands⁴ amounts to 6300 €/ha (14700 €/ha including land purchase). The project has lowered nitrate concentrations in surface waters, avoiding the potentially high cost of changing the catchment.

In north-western France as a whole, we have listed 1226 ha of woodlands planted to protect water catchments, in 80 sites. The average cost per hectare is comparable to the cost for the Rennes project.

Most of the water authorities contacted are interested in establishing further protective plantings, but have not yet looked into contracts with private owners as a way of doing so.

4. Cost including preparation, planting, tree protection, fencing and the first 3 maintenance operations.

The value of woodland water for households

There are several aspects to the services rendered by woodlands in terms of drinking water, depending on the scale and type of service. *In 2004, French households paid around 200€ a year for their drinking water (Ifen, Scees, 2004).*

More woodland = cheaper water

Every extra hectare of woodland saves 15€ a year on household water bills⁵.

This is the lowest saving in the range estimated by our model. The impact should be greater in studies on the most sensitive areas producing drinking water.

The purpose of this study was to measure the overall impact of woodlands on the quality of water before it is treated to make it fit for drinking, in comparison with the impacts of other land uses. The environmental service we are concerned with here arises from the existence of woodlands, regardless of the woodland management methods applied. We analysed the links between land use, water quality and prices for drinking water supplies. Based on the data available, we made a nationwide study with data for each département which are highly aggregated but provide a great many explanatory variables (67 altogether).

Our study confirms that larger wooded areas are linked with better quality of untreated water and lower drinking water prices (fig. 2).

This value which woodlands have in comparison with other land uses justifies and strengthens the merits of woodlands and forestry activities in the areas concerned.

Woodland springs are a resource to be carefully preserved.

The Syndicat des Eaux des Moises (Haute-Savoie) is a water management body that takes particular care to protect its resources, especially woodland springs in mountain areas.

Under a Franco-Swiss Interreg project ("Alpeau"), a comparison of the operating costs for different water catchments managed by the Moises body (woodland springs, boreholes, pumping from Lake Geneva) showed that pumping lake water was 28 times more expensive than tapping water from woodland springs. It is therefore vital to preserve these resources, which can be used to supply natural water at very competitive prices.

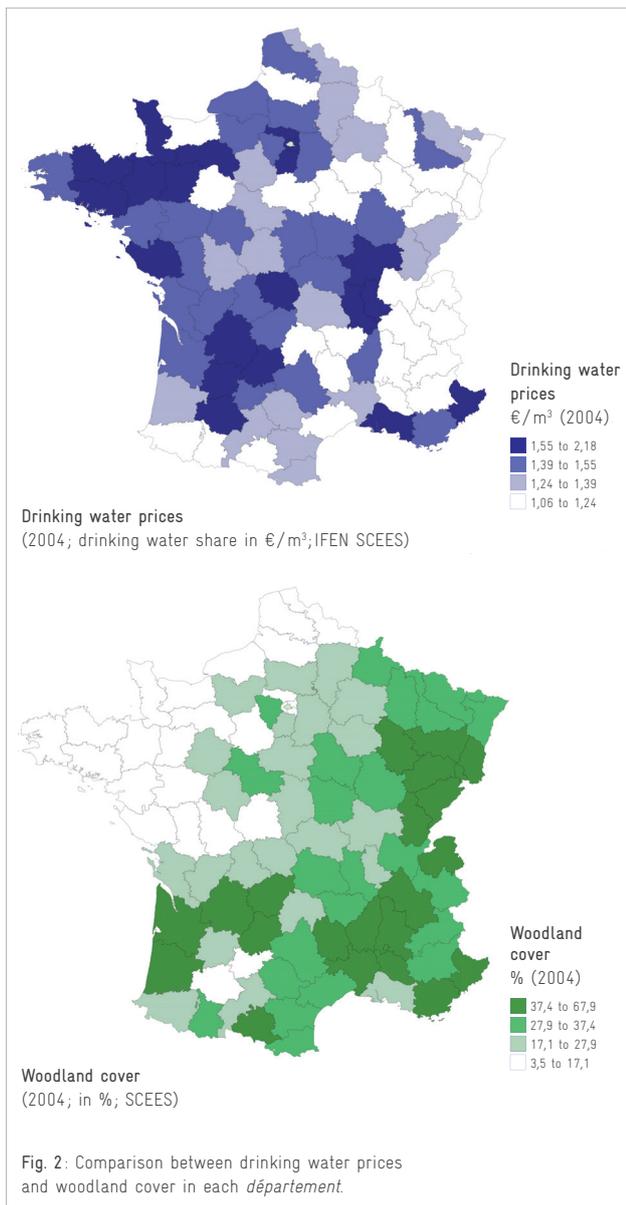


Fig. 3: Cable logging, is now in general use in catchment protection areas in Masevaux (68).

⁵ This saving is not calculated per household but from the aggregated water bill for all domestic users.



Right or wrong?
Over half of the French population believes, wrongly, that drinking water comes from treated wastewater.



What is it worth to have high-quality drinking water from the start, thanks to our woodlands?

Households value the natural image of woodland water

More than 50% of the French population believes that wastewater is treated directly in wastewater plants to produce drinking water (cf. C.I.eau, 2009). Promoting the positive image of woodland water is clearly worthwhile.

The methods of assessment we have referred to here are based on technical criteria, but the services rendered by forests have another and more subjective dimension. One of our aims is to identify the “trust factor” among households as regards woodland water.

Households are willing to pay up to 50€ a year extra to have, or to keep, tap water from woodland sources.

In this study, we assessed what households are willing to pay for “natural” water (with a minimum of treatment) from woodlands. The method is based on household surveys, which we conducted among two sample populations around the city of Nancy, with respondents asked to consider a scenario in which their drinking water came from a different source.

The population in the first sample receives water from woodland sources, with little treatment. The second sample receives water which is pumped from the Moselle River and heavily treated.

According to our results, any water supplier providing water from woodland sources would find it well worthwhile to promote the fact.

This study on how people value the source of their water shows the work of foresters in a new and positive light. It is placing relationships between foresters and water offices on a new footing and will thereby help to promote partnership initiatives.

Conclusions

We have made the economic case for the drinking water services rendered by forests. So what conclusions should we draw from these economic assessments? There are two clear messages.

“You could do worse, but it costs more ...”

This sums up the correlation between larger wooded areas, better quality of untreated water and lower water prices, and also reflects the value for households of natural drinking water from woodland sources: savings on water bills and naturally high quality.

“The fact that water quality is usually good doesn’t mean nothing needs to be done”

Water suppliers expect foresters to take precautions when working around vulnerable water catchments. Doing so under contract could help to meet these expectations.

What comes next ?

> Proposal of a model for contracts between foresters and drinking water producers, to secure better protection for water resources thanks to foresters. With a view to developing contract agreements, work on legal aspects is planned to clarify the distinctions between contract law and statutory requirements.

> In parallel, we will be testing a contract between foresters and a water producer. We also intend to discuss the question of forest management and its impacts on water quality with accredited hydrogeologists.

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