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Anticipated Effects of Re-Allocation of Intensive Livestock in Sandy Areas in the Netherlands

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Abstract: Currently plans are developed for a large-scale 'reconstruction' of the rural area in the Netherlands. Goals of the reconstruction are to diminish veterinary risks and to improve the quality of environment, nature and landscape. Spatial separation of land-use is an important instrument. The plans are prepared at a regional scale, involving stakeholders. We present an ex-ante analysis of the effects of these plans, including cost-effectiveness and integration with related spatial plans. Scenarios for the autonomous development of intensive livestock, spatial data-rich analysis and research in the field of public administration are integrated in the ex-ante analysis.

***Keywords**:* intensive livestock – reconstruction – veterinary diseases – Water Framework Directive – Nitrate Directive

1. INTRODUCTION

After a huge crisis on swine-plague in 1997, the Dutch parliament in 2002 enacted the 'Law on reconstruction of the sandy areas with concentration of intensive livestock'. The purpose of the law is threefold:

- diminish veterinary risks
- improve quality of nature and landscape
- improve environmental quality and water quality

The law applies to half of the Dutch rural areas, which are divided in 12 areas for reconstruction. For each of these, a local reconstruction committee develops a plan. Zoning of functions is an important instrument, the law discerns:

- areas for agricultural development (AAD) where enlargement and (re-)establishment of intensive livestock is possible;
- areas for function combination (AFC) of agriculture, housing and nature, where re-establishment or enlargement of intensive livestock is possible if in accordance with the spatial quality and functions in the area;
- areas for extensive agriculture (AEX), with nature or housing as primary function where enlargement or (re-) establishment of intensive livestock is impossible.

The reconstruction plans can interfere directly with spatial planning procedures. The plans are to be carried out between 2004 and 2016. The State, provinces, water boards and the European Union will invest 220 million Euro yearly.

The reconstruction is region-specific policy, which is appropriate if there are serious policy shortages in the area or if there are specific vulnerable functions such as nature.

This papers describes an *ex ante* evaluation of the effects of the joint reconstruction plans. We considered the effects of the plans in respect to earlier established (inter) national obligations for environment, nature and water and the original goals of the law; we considered the cost-effectiveness of the intended measures with respect to the autonomous developments in agriculture and intensive livestock in the Netherlands; we considered juridical and governmental aspects of the reconstruction; and we considered the integration of the reconstruction plans with other relevant plans.

2. METHODS

The current situation with respect to nature and environment is taken as a starting point. Data were taken from the 'Environmental Balance' and 'Nature Balance' published yearly by RIVM. Geospecific data on numbers of animals are taken from 'AGRIS', a database on agriculture. With GIS, calculations are made on animal densities per reconstruction area. Data on farm numbers, land use, farmers income were obtained from CBS

(www.cbs.nl). With respect to nature, with help of GIS overlays are made between the reconstruction areas and various categories of nature. Autonomous development of agriculture was modelled according to De Bont et al. (2003), based on numbers of animals per reconstruction area.
Information on the zoning was given by the provinces involved in the reconstruction, these GIS files are used for analysis of the relevant importance of the various zones, and overlaps with current and planned land-uses.
Information on juridical and governmental aspects was gained by literature study, and by a series of interviews with stakeholders in the various reconstruction areas (Driessen and De Gier, 2004). Databases on other relevant plans, such as for water and housing, are used of the consideration of horizontal integration with other spatial plans.

3. SITUATION AND DEVELOPMENTS IN THE AREA

3.1. Nature and Environment

Figure 1. depicts the location of the reconstruction areas in the sandy eastern and southern parts of the Netherlands. The livestock density is also given, in GVE/ha. In this units all livestock is summarised based on their phosphate excretion, a cow is one GVE.

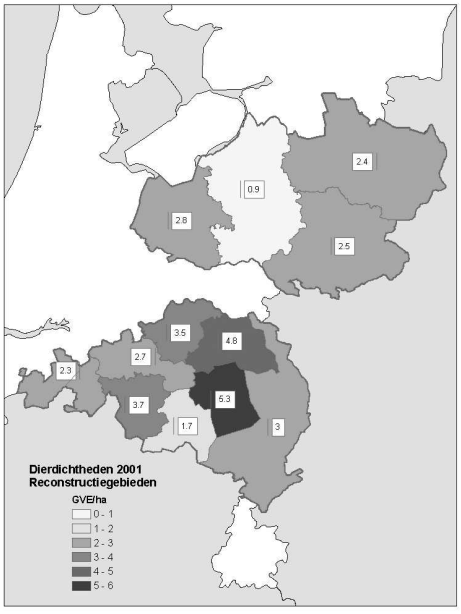

Figure 1. Reconstruction areas in the Netherlands, with livestock density.

High livestock density combined with vulnerable soils lead to a low environmental quality for eutrophication and acidification (Figure 2.).

Nitrogen deposition, nitrate concentration in groundwater and phosphate saturation of agricultural soils, are resulting problems. For other environmental themes -such as biocide pressure, dryness, sound and light disturbance- the situation in the reconstruction areas is comparable to other regions in the Netherlands (RIVM, 2002/2003).

The landscapes of international importance are situated outside the reconstruction area in the lower western part of the Netherlands.
Areas pointed out after the EU Bird- and Habitat Directives are mainly concentrated outside the reconstruction areas in the lower parts and wetlands.
Half of the existing and planned nature lies in the reconstruction area. The low environmental quality leads to problems for vulnerable types of nature. Furthermore a huge part of nature exists of small areas that are more vulnerable for the adverse effects of surrounding land-uses (RIVM, 2003).

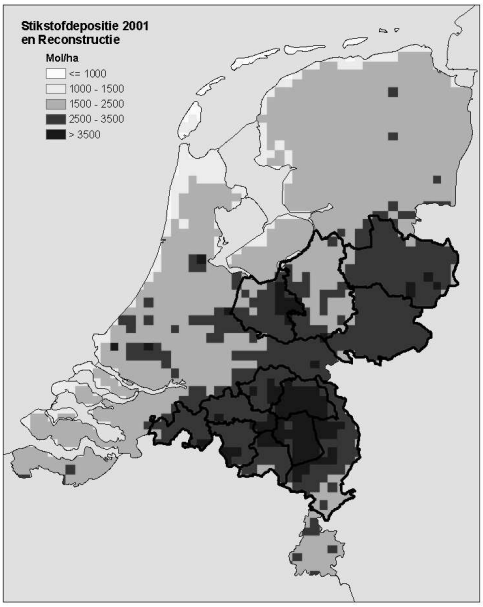

Figure 2. Nitrogen deposition (mol/ha).

3.2. Agricultural developments

There is a strong shrinkage of the number of farms. Remaining farmers intensify and enlarge their farms, to remain paying in spite of the high prices for labour and land. Thus, the shrinkage in farms does not self-evidently lead to a shrinkage in production factors such as cattle and land, and neither to a strong reduction in environmental pressure.

Shrinkage in livestock was 11% (expressed in GVE) in the reconstruction area between 1990 and 2000 (Figure 3.).
Based on a scenario including established policy and CAP reform (De Bont et al., 2003), which was supposed on the historical figures per region, a further shrinkage in livestock of 13% until 2010 is foreseen.

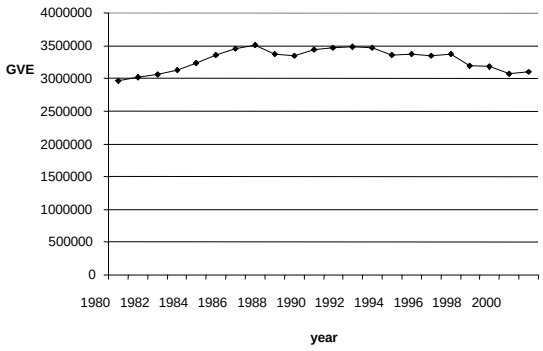

Figure 3. Development of total livestock in the reconstruction area

The high prices for land lead to an acceleration of scale enlargement in land-bounded agriculture, and a replacement of badly paying agricultural sectors by more paying sectors such as horticulture, bulb farms and tree-nurseries.

3.3. Relevant (inter)national laws

Next to existing laws, many water and environmental laws are developing. The Manure Law will be changed in 2006, as a result of the judgement by the European Court that the Dutch implementation of the Nitrate Directive is insufficient. The obliged norm of 170 kg/ha manure will -without a shrinkage of livestock- lead to a large rise in costs for livestock farmers.
The Water Framework Directive (WFD) leads to obligations for nitrogen, phosphate and toxicant concentrations in water which will be equal or lower than current Dutch 'Maximum Tolerable Risk Concentrations' (MTR). However, the MTRs are no obligations and are not legally implemented. The Netherlands can hardly meet those obligations for reasons of the historical pollution, large-scale exceeding of the current MTRs and exceeding of the less stringent obligations from the Nitrate Directive. Following the judgement of the European Court on the Nitrate Directive, the Netherlands should take additional measures on reaching the WFD obligations (Van Rijswick et al., 2004). The reconstruction can be a vehicle for such measures.
Areas for the implementation of the Bird- and Habitat Directive are pointed out, therefore maintenance goals will be formulated to the end of 2004, which may be more stringent than WFD obligations.
Finally, emission reduction goals following the NEC Directive are currently in negotiation for 2020.
All mentioned juridical developments strengthen the need for a lowering of environmental pressure by intensive livestock.

3.4. Conclusions

The Netherlands do currently not meet European Directives, and the foreseen shrinkage of livestock is insufficient to meet targets. The reconstruction is one of the means that can contribute. The fact that the agricultural sector is currently dynamic, ameliorates the possibility to steer developments.
Goals to be reached on the different relevant fields for reconstruction are, mostly quantitative, recorded in (inter) national regulations and laws. For an overview see Van Wezel et al. (2004). It is not set clear beforehand how far the reconstruction should contribute in meeting these goals. In view of the large-scale process and investments however, it might be expected that the contribution of the reconstruction on meeting the goals is significant.
The major problems in the reconstruction areas are directly related to the intensive livestock and the high livestock density. Intensive livestock farmers want to develop and enlarge for economical reasons, but because of other functions in the region, manure-related environmental targets and veterinary vulnerability this is undesirable.

2. RECONSTRUCTION PLANS AND EFFECTS

3.1. Zoning

All reconstruction plans used the instrument of zoning; an overview of the situation of the different zones (AAD, AFC and AEX) is given in Figure 4.
Marked are the differences between the various reconstruction areas in the relative areas for the different zones. The low scale of plan development results in an even lower scale of the zoning. A higher scale of the different types of areas would result in a lesser mutual adverse influence between different land-uses.
Farms in the AEX often still have unused planological rights. These remain respected, which means that the farmers still can develop which is not in line with the intentions of the Law on Reconstruction. However, not respecting these rights would presumably have lead tot high public

costs for settlement of damage (Driessen and De Gier, 2004). On the long term, farmers in AEX will have no possibilities to further expand than current rights.
In the AAD there will be public and private investments because farmers with growth potential will be replaced from AEX to AAD. These replacements will hardly be effective to diminish the environmental problems as they do not lower the environmental pressure, or lower livestock intensity. The environmental pressure remains and as the background concentrations of for example ammonia remain high, the acidification problems in nature areas will still exist. If other measures or general policy can reduce the environmental pressure, zoning will be more effective as the background concentration is lower compared to the point sources around a nature area for example.
Zoning can be viewed as an instrument to concentrate public investments, for example on agricultural nature conservation. If this instrument is put in concentrated, its revenues are higher (Opdam and Geertsema, 2002). Presently, the available demand for this form of nature conservation is higher than the supply, especially in the Dutch provinces with much intensive livestock (e.g. NB and Li, Figure 5).
The Dutch Cabinet ended a broad discussion on the future of intensive livestock with the statement that 'there is a future for intensive livestock in the Netherlands'. The Dutch Cabinet will give new room for establishment for farmers in AAD. However, in view of the preceding, this perspective can be laid for example in working in the food production chains, or in the use of state-of-the-art technology, but the perspective can hardly be laid in further intensifying livestock intensity in these areas.

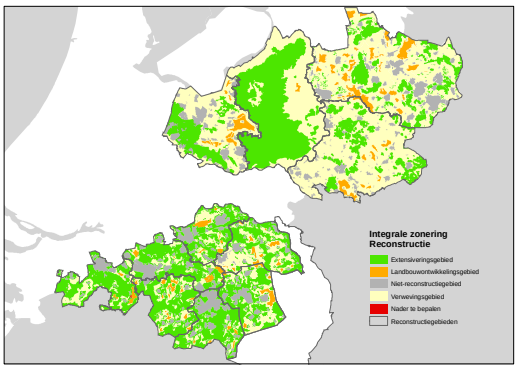

Figure 4. Situation of areas for agricultural development, areas for function combination and areas for extensive agriculture.

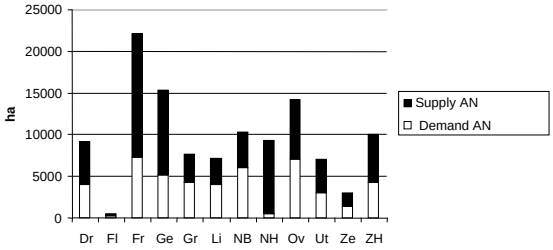

Figure 5. Supply and demand of nature conservation by agriculture in Dutch Provinces

3.2. Investment packages

An analysis of the investment packages shows that the different reconstruction committees vary in their spending of means over themes. In general investments in agriculture (improvement of agricultural structure), nature and water are important, while investments in recreation and tourism, quality of life and landscape take only a small part of the available budget.
Although a veterinary crisis in 1997 was the immediate cause for the reconstruction, which was followed by two crises in 2001 and 2003, hardly measures to reduce veterinary risks are taken in the reconstruction plans. A lower livestock density, a reduction in contacts, and a regionalization of intensive livestock is inevitable on the long term (see also RLG/RDA, 2003). Actions to this end should be taken by the sector; apparently the reconstruction process gives insufficient impulses to do this.
The foreseen lowering in environmental pressure is mainly explained by autonomous development and (proposed) general policy, not by the measures taken in the reconstruction. For example, results are given for the province of Gelderland (Figure 6.). In view of the present technological possibilities -for housing and feeding of livestock, fertilisation, manure use and –depots-, either shrinkage of livestock or export of manure is inevitable to reach environmental targets.

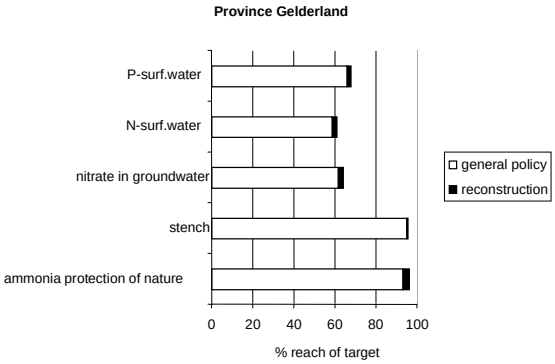

Figure 6: Contribution of reconstruction to the reach of target compared to the contribution of general policy (data by Gies et al., 2003).

3.3. Integration in other spatial plans

All plans are incorporated in the regional planning system, and thus are legally binding. This is not the case for water plans made on regional level.

3.4. Governmental and juridical aspects

Based on literature and a series of interviews with parties involved in the planning process, conclusions are drawn regarding plan development (Driessen and De Gier, 2004). The study gives the impression that parties involved subscribe to the plans, there is support. The emphasis by law on zoning results in less attention being paid to other possible solutions for problems related tot intensive livestock farming. The initial ambitions in the zones for extensive agriculture were adjusted, after both the central government and the provinces appeared hesitant to pay for damage caused by earlier planning. The central government will assess the plans according to a detailed framework and decide for financing, after the provinces have drawn up the plans. This will leave little room for interpretation by provinces themselves. Due to developments in relevant environmental laws and re-prioritising policy goals, parties involved had little certainty beforehand. The emphasis on realising targets will lead to risk-free planning.

4. CONCLUSIONS

Major problems in the reconstruction regions are directly related to the intensive livestock and its high density. Intensive livestock farmers want to develop and enlarge, but because of other functions in the region, manure-related environmental targets and veterinary vulnerability this is undesirable.
The shrinkage in farms does not lead to a proportional shrinkage in production factors or reduction in environmental pressure. The foreseen shrinkage of livestock is insufficient to meet targets of current European Directives. Water and environmental (EU) laws are developing and strengthen the need for a lowering of environmental pressure. The fact that the agricultural sector is currently dynamic, ameliorates the possibility to steer developments.
The low scale of plan development, results in an even lower scale of the zoning. A higher scale of would result in a dimished mutual adverse influence between land-uses.
Farms in the AEX often still have unused rights. These remain respected, so farmers still can develop on the short term. Farmers with growth potential will be replaced from AEX to AAD, these replacements will hardly contribute to diminish the environmental problems. As the background concentrations of for example ammonia remain high, the acidification problems in nature areas will still exist. Zoning can be more effective if background concentrations are lowered.
In general planned investments in agriculture, nature and water dominate compared to investments in recreation and tourism, quality of life and landscape.
Although a veterinary crisis was the immediate cause for the reconstruction, hardly measures to reduce veterinary risks are taken in the reconstruction plans. The effectiveness of 'pig-free' zones to reduce veterinary risks is broadly doubted, and they scarcely change the current situation. A lower livestock density, a reduction in contacts, and a regionalization of intensive livestock is inevitable on the long term.
The foreseen lowering in environmental pressure is mainly explained by autonomous development and (proposed) general policy, not by the measures taken in the reconstruction. In view of the present technological possibilities -for housing and feeding of livestock, fertilisation, manure use and –depots-, either shrinkage of livestock or export of manure is inevitable to reach environmental targets.

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