Policy Brief #1

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Transition in the livestock sector: *Exploring trade-offs in environmental policy*

TRANSrisk

TRANSITION PATHWAYS AND RISK ANALYSIS FOR CLIMATE CHANGE POLICIES

Policy Briefs

At a glance

Thematic area: Water Quality, Air Quality, Renewable Energy, Nature & Biodiversity, Climate Change, Circular Economy, Agriculture

Key words: Policy interactions, trade-offs, transition pathway, livestock, agriculture

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Priority issue: Trade-off risks

Target audience: Policy makers and market actors in agriculture / livestock

Key Points

1. Given the broad spectrum of environmental and human/animal health related regulation in the livestock sector in the Netherlands, there is a high potential for trade-off risks.

2. A trade-off risk makes it more difficult to achieve environmental policy objective A, whilst efforts are being undertaken to achieve objective B.

3. Some of the identified potential policy related trade-off risks include:

    a. Reduction efforts to reduce phosphate excretion in dairy sector could lead to overall lower cattle grazing levels.

    b. Leakage of greenhouse gas emissions (GHG) to third countries due to export of productive cattle abroad.

    c. Domestic land-use change and land-use management change resulting from GHG emission reduction efforts.

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1. TRADE-OFF RISKS OF A TRANSITION IN THE DUTCH LIVESTOCK SECTOR

There is a need to enhance the sustainability of the Dutch livestock sector. Its social, environmental and economic performance needs to improve if the sector is to remain viable in the long-term. Within the political arena, environmental impacts linked to livestock systems have been a major area of concern.

The sectors' impact on air quality (PM, NH3), water-soil quality (nutrient run-off), as well as on climate change (GHG emissions) are well-known. While great achievements have been made in reducing environmental impacts, the sector needs to take further steps to improve its overall sustainability.

To tackle environmental issues in this sector, a range of EU policies has been implemented. Table 1 provides an overview of key environmental policy frameworks (and their quantitative targets) that are relevant for the Dutch livestock sector. The table includes current achievements relative to 2020 and/or 2030 targets. It also shows that the sector can, and in some cases, must act in order to meet national targets. It is important to note that not all policy frameworks have been implemented (or amended) at the same time, indicating that the policy mix is not a constant factor through time, and that the number of policy instruments accumulate as new frameworks are added.

The expanding and changing mix of environmental (and other) policies has meant that the complexity of the policy environment increased. Good as well as bad interactions between policy frameworks have been observed. There are specific concerns about the unwanted side-effects of such interactions (i.e. trade-offs). The risk of such trade-offs is that the (policy) efforts to meet one target can partially/completely offset the effects of policy efforts for meeting another target.

Table 1: Environmental Targets Relevant for the Livestock Sector in the Netherlands

Target	Current (year)	2020	2030	Units	Source
Renewable energy	5,80% (2015)	14%	27%	Gross final energy	EU Climate & Energy Framework (EC, 2016)
Non-ETS	98,1 (2014)	111,6	-36%	Mt CO_2-eq.	(EC, Proposal for an Effort Sharing Regulation 2021-2030, 2016)
Non CO_2-in agriculture	19 (2014)	16		Mt CO_2-eq.	Agro Covenant (LNV, 2008)
Air - methane (national)*	18,6 (2014)		13,4	Mt CO_2-eq.	Clean Air Policy Package (EC, Proposal for a DIRECTIVE, 2013)
Air - ammonia (national)	134 (2014)	128	120	Kt	Clean Air Policy Package (EC, Proposal for a DIRECTIVE, 2013)
Phosphate (national)	176,3 (2015)	172,9		Mln. kg	(EC, The Nitrates Directive, 2016)
Phosphate (dairy sector)	86,1 (2014)	84,9		Mln. kg	Dairy sector Covenant

** The proposal for a new National Emission Ceiling Directive included a national target for CH_4 emissions. However, just before the Directive was adopted, this specific target was excluded.*

Identifying and analysing such trade-off risks for specific sectors is useful for policy making in a period of transition. Within TRANSrisk's work on the Dutch livestock sector a number of potential trade-off risks from policy interactions have been identified.

Although further stakeholder consultation and modelling is needed to better assess and quantify these risks, it was considered useful

to use current stakeholder engagement to openly debate if more trade-off risks exist and how severe they are relative to other risks.

2. Reducing phosphate production and the risk of reduced grazing in Dutch Dairy

Two important socio-environmental objectives in today's Dutch dairy sector are:

1. The need to reduce phosphate production in animal manure, and

2. The ambition to increase the number of cows that are allowed to graze outside.

The EU and the Dutch government have agreed to a derogation to the EU's Nitrates Directive, meaning that Dutch agriculture can use more animal manure on land than is stated in the Directive. However, it is currently uncertain if the derogation agreement will be extended for the next planning period (starting from 2018 onwards).

To obtain the derogation in the first place a national phosphate (P) production ceiling was agreed with the EU. The recent increase in P-excretion by livestock in the Netherlands has already caused the national P-production to exceed the agreed maximum level for two years now (2015-2016). One of the key factors contributing to this P-increase was the rapid expansion of the Dutch dairy sector since the EU's milk quota system was abolished. Milk production soared, as well as manure production.

Another important target for the Dutch dairy sector is that cows should be allowed to graze outside. Animal health and well-being is a growing public concern that grew in parallel with the further intensification, industrialisation and growth of dairy farming in the Netherlands.

On 23 February 2017, a motion on 'grazing' was accepted by the Dutch Parliament. This motion sets a specific target for the cattle-sector (dairy and meat) with regards to the total percentage (80%) of cows that should be allowed to graze outside. While this motion to improve animal welfare is not yet embedded in legislation, it is expected that some form of a sectoral grazing target is likely to be in place in the near future.

Since both targets (P-excretion and grazing) are targeting the same sector there is a potential direct trade-off risk. This risk could entail that efforts to meet the one target could undermine efforts to meet the other.

In their efforts to preserve the derogation for the Dutch agriculture, the Netherlands government and the dairy sector launched a buy-out scheme on the 10th of February 2017. This scheme offers a subsidy of EUR 1.200 per dairy cow for each dairy farmer who is willing to terminate his dairy farm. The buy-out scheme is an 'emergency measure' to ensure that the dairy sector quickly reduces its P-excretion in 2017. The incentive to bring down P-production is strong, because without this derogation the Dutch livestock-agricultural sector would be severely (economically) affected. Without derogation, a much larger reduction of cattle livestock would be needed (about 480.000 cows according to an unofficial estimate).

To avoid such a catastrophic outcome, high priority was given to the buy-out scheme that aims to take about 60.000 cows off the Dutch market. There is EUR 42 mln. buy-out budget available. A first subsidy tranche of EUR 12 mln. (for about 10.000 cows) opened on Monday 20 February. This tranche closed 24 hours later due to popular demand. Within one day about 498 farmers (for a total amount of EUR 48 mln.) signed up for

this scheme, thereby indicating they wanted to terminate their dairy farming activities.

It is expected that this buy-out scheme, combined with several other policy actions, is likely to be effective in bringing the national P-excretion down to a level somewhat below the agreed ceiling. However, to date there have been few (if any) concerns about whether or not this 'national P-reduction plan' could potentially negatively affect the achievement of other social and/or environmental objectives today or in the future.

Preliminary information from the buy-out scheme indicates that dairy farms with an average of 80 cows have indicated to want to stop their activities. With the national average dairy farm size being 90 cows, the buy-out scheme has attracted smaller than national average farms. Also, industry experts indicate that most dairy farms that have an interest in the buy-out subsidy are those where farmers already had plans to terminate their business. Many such dairy farms face the problem of finding a successor who wants to continue the farm. Succession problems are more common with smaller family owned dairy farms.

One of the key characteristics of smaller dairy farms <80 cows is that they generally have a higher percentage of grazing cows (see Figure 1). Lower grazing percentages are observed with larger, more intensive dairy farms.

Although we need to be cautious in drawing firm conclusions here (not all firm size/characteristics data of the buy-out scheme have been analysed and been made public, yet), there certainly is a potential trade-off risk that such a buy-out scheme can have a negative impact on cattle grazing, as it could result in the closure of farms that allow for more grazing.

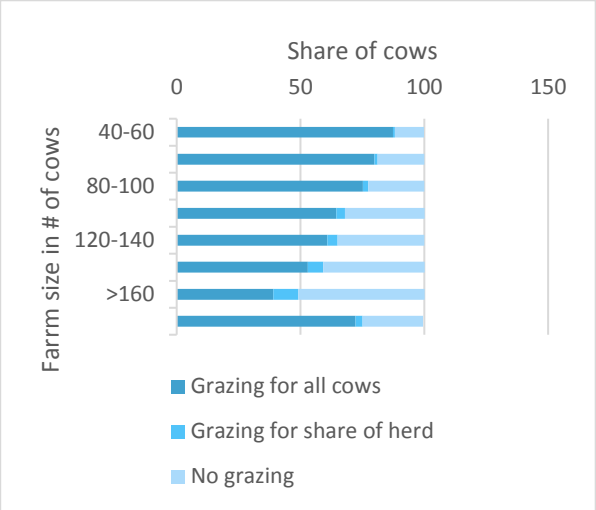

Figure 1: Grazing and farm size in the Netherlands (2015)

Source: CBS, 2016

Knowing that the buy-out scheme did not include any further entry conditions with regards to farm-size or farm-structure it could well be possible that today's policy efforts to meet the P-reduction target have made if more challenging to meet the grazing target of tomorrow, as a relatively larger number of grazing cows will be taken off the Dutch market.

3. QUANTIFYING A TRADE-OFF RISK: HOW BAD IS IT?

Based upon the available information, a back-of-envelope calculation can be made to quantify the effect of this specific trade-off risk. The scheme is open for about 60.000 cows. Assuming the farms taking up the scheme are smaller (more extensive) with a typical grazing rate of about 83%; compared to an average larger (more intensive) farm with a grazing rate of about 63%, this would make for a difference in the percentage of grazing cows of 20% that are taken off the market. With a scheme total of 60.000 cows the 'extra' reduction of grazing cows would be in the order of 12.000 cows.

With a national total of 1,6 mln. dairy cows (2015), and with an assumed 80% grazing

target for all cows, a total of 1,28 mln. cows would need to be able to graze. In 2015 about 1,04 mln. cows could graze outside, leaving a 'gap' to grazing target of 240.000. Taking these extra 12.000 cows off the market would make up 5% of this 'gap to target'. Although the quantitative impact of this trade-off is significant, it is considered unlikely that this will materially affect the industries activities in a negative manner.

Although the expected quantitative effect of the identified trade-off is not that spectacular, the example is proof of the existence of trade-off risks. Besides this specific risk, several other potential trade-off risks have been identified from the assessment of the impacts of two alternative transition scenarios (transition pathways) for the Dutch livestock sector. These include:

- *GHG leakage*: Phosphate reduction measures in the Netherlands (e.g. the buy-out scheme) lead to a relocation of CH_4 emissions from the Netherlands to other countries. Note that the buy-out scheme requires the participating dairy farmers to either slaughter their productive cows, or export them abroad.
- *Land-use change*: Reducing the size of the domestic livestock sector will likely result in grassland being converted into cropland; this in turn causes a temporary flux in CO_2 emissions due to release of soil carbon and a potential increase in the use of fossil fertilisers (as less organic fertiliser is available).
- *Limit on biogas production from manure*: Mandatory grazing targets could put a technical limit on the maximum amount of animal manure that can be used for biogas production.
- *Increased antibiotics resistance*: Relocating dairy production from one country to another will most likely solve local environmental problems (e.g. nutrient loading, and air quality), but might come at the expense of human health, as other countries can have weaker codes of conduct for the use of antibiotics in livestock.

These trade-offs have been identified with the help of a literature review and targeted stakeholder consultations in the sector.

Within the TRANSrisk project we are currently modelling the impact of the Dutch livestock sector transition that is needed to meet an assumed 2030 GHG emission target (for more background information on the livestock case study please see 'more information'). For this case study, the livestock sector is assumed to need to reduce its CH_4 emissions by 33% relative to 2005 levels. We consider this to be a fair target (effort sharing) for this sector given the nationally binding target of -36% GHG emissions by 2030.

Further research efforts within TRANSrisk focus on more in-depth analysis and quantification of these risks. The results of this trade-off risk assessment will be used to improve the quality of economic models. Preliminary qualitative and modelling results on the two transition pathways for the Dutch livestock sector suggest that there are (yet) unknown or unquantified trade-off risks that could have a profound impact on the performance of this sector.

4. More information

- This policy brief was developed from a TRANSrisk case study on the Dutch livestock sector. You can read the full case study context at: http://transrisk-project.eu/content/transrisk-results
- TRANSrisk's 'work package 4' is studying synergies and conflicts between different energy system pathways. There is more information on this work, and on TRANSrisk as a whole, on our website http://transrisk-project.eu

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TRANSITION PATHWAYS AND RISK ANALYSIS FOR CLIMATE CHANGE POLICIES

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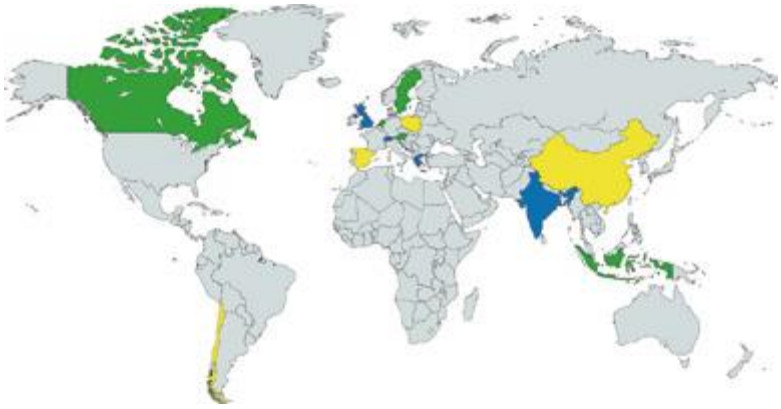
About TRANSrisk

TRANSrisk is studying the *risks and uncertainties* within *low carbon transition pathways*, and how transitions can be implemented in ways that are *technically*, *economically* and *sociably* feasible. The project's objective is to produce a new *assessment framework*, and an accompanying *toolbox, for policy makers*.

TRANSrisk's unique approach sees us combining *economic computer models* with *input from people working in the area of study* (*"stakeholders"*). Models provide a useful means of predicting the future impacts of decisions we take now, but *factors such as political opinion and public acceptability* are very difficult to predict via a purely numerical approach. TRANSrisk is using *stakeholder input* to feed our *models*, and is presenting the results *back to stakeholders* to see how this affects their views.



14 country case studies lie at the core of TRANSrisk's work. To fully understand the range of transition pathways our *case studies encompass the globe*, as presented in the adjoining map. In alphabetical order they are: *Austria, Canada, Chile, China, Greece, India, Indonesia, Kenya, the Netherlands, Poland, Spain, Sweden, Switzerland and the United Kingdom*.

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