



Dealing with knowledge

In Transitions

A survey into the unknown

Advice of the Advisory Council for Research on Spatial Planning, Nature and the Environment to the Minister of VROM and the other Ministers involved

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1. Introduction

In his letter dated 16 August 2001 the Minister of Housing, Spatial Planning and Environment (VROM) has asked the RMNO to advise him in three stages on the knowledge needs in connection with the government policy on space, environment and nature. This as a direct result of the publication of the "Fifth Strategic Document on Spatial Planning, and the Fourth National Environmental Plan. Part of this was the quest for advice on the subject of knowledge needs with regard to the ongoing operationalisation of the concept Transition Management, in particular focused on the part the government plays in this.

2. Working? method

The request for advice has been targeted by two steering committees within the RMNO council. After discussions with the Transition Support Office of VROM, interviews have been held with the key persons responsible for the transition processes within the Ministries of Economic Affairs, Agriculture, Nature and Food, International Cooperation and Transport and Water Management. As a result of these interviews and a brief literature survey, a list of questions and points of attention has been drawn up. On the basis of the reactions of the key persons mentioned, four questions from that list have been selected for further analysis. With regard to these questions, opinions have been gathered from literature and interviews to form a picture of relevant schools of thought. There was no intention to be complete. on the subject. Also use was made of the report of the International Conference on Transitions which was held in Enschede in July 2002, as well as a study on transitions and R&D policies which was carried out under the authority of the RMNO. You will find more on this subject in the accompanying background document to this advice.

The questions and the collected material have been discussed in a workshop held at the Ministry of VROM on November 11th 2002. The aim was to find out how scientists in particular approached these questions. Additionally the workshop rendered some indications on what may be considered robust knowledge, and the participants have been asked explicitly to write down their knowledge questions as well as their **learning points**. These knowledge questions can be seen as input to a knowledge agenda which will evolve further in discussions between the key people in transition processes, researchers and other parties concerned who may or may not participate in a research network. In the background document you may read more about this.

Partly on the basis of the exchange of ideas in the workshop the Council has developed its own vision on transition processes and transition management which have been described in the advice included.

3. Why "transitions"?

3.1 Persistent Environmental problems and transitions

The National Environmental Policy Plan (NMP4) has boosted the start of the political career of the concept of "transitions". In the NMP4 a number of environmental problems have been characterised as persistent. These are the problems on climate change, loss of biodiversity, mobility and agriculture. Some of these problems are of a global nature (climate change); others are more prominent on a national or regional scale. There are solutions to these problems, but some of them are on European level, others national or regional. All of these solutions have a limited effect.

In order to effectively address a global problem such as climate change, a global strategy towards the green house gas emissions is needed, which in turn also requires national and regional adjustments.

Loss of biodiversity mostly is related to spatial planning on a national and regional scale, and to how biodiversity is conserved. Also it involves environmental pollution, exotic organisms, which may or may not have been consciously introduced, etc.

From the point of view of sustainable development a normative element must be introduced as well. Taking into account all possible future prognoses and circumstances, sustainable agriculture cannot be described beforehand. On the other hand the concept of sustainable

development enables us to design integral foresights and look for solutions. Different levels must be taken into account (regional, European and global), in order to be able to ascertain what the system limits are. Many of the causes of so called persistent environmental problems are, at least partly, beyond the competence of national governments. Causes and solutions are linked to various levels, which causes a dilemma for national governments. This complexity causes the prevailing approach of national governments to render only a limited result, which is in view of long term solutions insufficient.

Complexity is the keyword in persistent environmental problems. These problems characterise themselves in that the issues transcend sectors and have effects on various levels simultaneously. This makes it imperative to make a structured analysis on the type of intervention, as well as by which level of government, that will result in the best suited solution to the environmental issue at hand. Perspectives of interventions must correspond with the level to which the problem is related to. Government intervention may take various forms: (co-)financing R&D efforts (innovation policy), stimulating knowledge networks, or creating a demand for socio technical solutions through a system of emission trade (e.g. the EU-wide introduction of the system of marketable CO₂-emission rights), taxation or the announcement of stricter emission and production demands in the future (e.g. zero-emission vehicles). The interventions can also be of an administrative or institutional nature.

In the past technological transitions went hand in hand with institutional changes. Taking into account the very nature of the persistent problems mentioned in the NMP4, one should avoid thinking solely of technological solutions, but also address (institutional) changes to taxation systems, responsibilities and rights of ownership. Each transition process needs an analysis of possible interventions by national, regional and transnational governments (EU), as well as the obstacles that may become evident in practice. E.g. Technical prescriptions on EU level contrast with national policy which is focused on policy targets, and another obstacle may be that European policy may not allow a national innovation policy to create certain niche markets. The policy space of the national government must be crystal clear for these transition processes.

If solutions are for an important part beyond the reach of national governments, a national government may – keeping in mind the abovementioned policy space – consider regulations as an incentive for industries in another country. California has, on the basis of its policy to reduce air pollution, announced a zero emission law to stimulate development and introduction of zero emission cars. The car industry is situated in other states of the USA. California is an example of a state that does not feature a car industry, but attempts to influence this industry by its laws. In The Netherlands the car with the catalytic converter was introduced in likewise fashion, despite misgivings with the EU. Within the various transition processes an analysis needs to be made to what level The Netherlands can influence them, what part the national government and other involved parties, such as researchers, can play on an international level. It would be unjust? to characterise transitions as a long term concept covering up the relative lack of power of the national government, as is being posed by some critics.

Who ever asks the question what knowledge is relevant for transitions as seen from the eyes of the Dutch government, must ascertain beforehand to what extent the transitions within the four NMP4 problem fields can be influenced, or effectuated on a national scale, and how the part of the national government can be streamlined with the (possible) role of regional and transnational governments. Transitions do not by definition require a demand driven technological innovation policy of the National government. Should the bulk of the system innovations and resulting transitions be realised outside The Netherlands, careful consideration should be given to how Dutch knowledge institutions can focus on that utilising their specific strengths. In other words, how do they secure the best bits for themselves?

In order to decide which are the most interesting aspects to the innovation system to which Dutch research institutions can contribute, is it advisable to have a well organised informa-

tion centre. It should also not be excluded beforehand that the Dutch government creates space for experiments, niches, with regard to transitions, keeping in mind the European laws with respect to market processes in research policies.

3.2 What is new in transitions?

The concept transition seems to be in a *pre-paradigmatic phase*. There are various conceptual images which refer to transitions and transition management, and various links are possible with other concepts such as “co-evolution”, “integrated assessment” as well as the relevant knowledge linked to these concepts. Choosing one definition of the concept of transitions over another is at this stage premature.

Although the concept is in a preparadigmatic phase, it is possible to indicate several features to the concept which have been accepted in general.

In the first place a transition process is aimed at the long term (10-30 years). A transition process will be established through system innovations. A transition involves various sectors (multi sectoral). The transition aimed at sustainable energy does not involve industry alone, but housing, transportation etc. as well.

Within a transition the involvement of the stakeholders is important, not only to make the process legitimate, but also because a new configuration of the stakeholders revitalises the issue. Existing interest configurations will be forced open to create new insight and ideas, new combinations and perspectives. Creating a vision is important as the engine to this process. It is aimed at future perspectives, which should, ideally be generated through mutual dialogue with the new group of stakeholders. Visions of the future inspired through sustainable development are necessary to be able to work on changes in a system. Essential is the willingness of various parties concerned (stakeholders), scientists and governments to participate in experiments which will stimulate system innovations. The kind of interventions that are (is?) being considered will be different for each transition process, as has been indicated above. But transitions will often involve institutional changes (responsibilities, rights of ownership etc.)

Implicit (silent) knowledge in transition processes can be just as important as explicit scientific knowledge. It is expected that transitions require foremost interdisciplinary knowledge which is attuned to the knowledge demands (needs?) of the parties involved. This in fact refers to a transdisciplinary scientific approach.

Knowledge is a limited part of a transition process, the rest is characterised by chaotic occurrences and perhaps dialectics. Analogical thinking is very valuable in this. The originating process of e.g. technological innovations very much resembles a (co) evolutionary process. Variations emerge as a result of the interaction between science and society. Then a selection of variations takes place.

Analogously(?), transition processes seem unpredictable. But this does not mean that they cannot be influenced in a limited way at certain points in time. From research into technological transitions it becomes clear that it is possible to indicate that modulation of a process at certain moments is possible. Manipulations are possible at certain moments.

As a result of the long term character and the unpredictable experimental features of a transition process, it is imperative that one establishes learning points at regular intervals. By some this aspect of reflection is summarized in the following phrase; “you learn by doing, you do by learning”

3.3 Indications – learning to recognise patterns

To what extent is it possible to find indications in social developments, of upcoming transitions, or even ongoing transitions? Some people will reason that in the field of water management there is a transition taking place. For some time now a different train of thought is being adopted by policy-makers with regard to water management. The implementation of that train of thought will take some more time.

Also in the past, agriculture has undergone various transitions, but if there are any indications of such a transition now remains to be seen. It is however possible to recognise two

types of innovation patterns in agriculture, which are evolving side by side. One in the classic way, through research aimed at production, the other focusing on the farm and its role within the surrounding area.

Recognising the innovation patterns in sectors which are connected with the transition themes is an important point. Some scientific knowledge is already available for this. Technological innovations can be mapped through a prospective technological analysis, which will show several development paths, and how parties involved can influence (modulate) these.

3.4. How to shape the interaction between Science, Policy and Society in the case of transitions?

How the interaction between Science, Policy and Society can best be shaped is a question RMNO answers by referring to earlier publications (“Willingly and Knowingly” (2000), “Disaster, Success or Failure”, 2001) and a recent publication (in Dutch) “Boundary Work: paradoxes and dilemmas” (2003). It should be clear that interactions in transitions should enable a learning process. In other words, there is no political or scientific primate, but an interaction between science, policy and society, aimed at learning. In “Willingly and Knowingly” and more recent publications RMNO has formulated recommendations for the realisation of this interaction model. This entails, among other things, that in order to create a common knowledge base, to deal with uncertainties, to draw up a knowledge agenda, and to guarantee quality and learning by doing, an interactive working method is needed and certain methodologies (such as extended peer review) are imperative.

4. Recommendations

Taking into account the abovementioned reflections the Council has formulated the following recommendations to the Ministers involved and the key persons of transition processes.

Recommendation 1:

As thinking about transitions is in a pre-paradigmatic phase, it is not advisable as a national government to embrace any **one** train of thought solely. Creative competition is desired in such a situation. After some time the best applicable train of thought will become clear. It is advisable to ascertain if and to what extent different trains of thought lead to different approaches of transitions or that generally speaking, in practice no major differences occur. This should only take place after recommendation 2 has been effectuated, which deals with the setting of a specific transition process within the international context and the stipulation of policy space of national and other governments.

Recommendation 2:

It is advisable that the transitions as described in NMP4 – as far as there remain any uncertainties on this point – to make an analysis of the policy space on the national level in contrast to the international (EU) and regional level.

This means that the sector transcending and multi level nature of the problem needs to be taken into consideration, and an analysis should be made of the kind of interventions that will enable the national government to stimulate solutions. Possible interventions by the government need to be tuned to the level at which the problem is to be tackled.

This analysis leads to more consciousness of the (possible) roles that the parties involved may play in these transition processes on a national, regional and international level and will open the door to (international) co-operation. The desired innovations can be of a technological nature, and/or pertain to institutional changes in e.g. fiscal systems, responsibilities and ownership rights.

Recommendation 3:

Due to the complexity and lack of consensus on the knowledge and values concerned, transition processes should be seen as unstructured problems. A dialogue model of interaction between science, policy and society is most effective in such a situation. This entails, among other things, that in order to find a common knowledge base, to deal with uncertainties, to

draw up a knowledge agenda, and to guarantee quality and to learn by doing, an interactive working method is needed and certain methodologies (such as extended peer review) are imperative

Recommendation 4:

If technological innovation seems to be, or seems to become an important part of the required transition (energy, agriculture, mobility), it is advisable to make an analysis of the relevant regime in order to recognise patterns and windows of opportunity. This prospective technology analysis can map the development paths, and how parties involved can influence (modulate) these.

Whether institutional renewal solely can bring about system innovations, and who plays what part in this, is matter for discussion and clarification.

Recommendation 5:

Without vision(s), there can be no system innovation. Creating a vision involving (certain) stakeholders and others is desirable. The creation of a vision is the result of interactions aimed at the future and sustainable development.

Recommendation 6:

An analysis of the nature of existing (policy)networks within the field of a transition is necessary to ascertain if the present relationship between governments and other parties, stimulates or prohibits innovations. In order to establish a transition network one needs to learn from this. In a co-operative quest for innovations the option of network steering or self steering fits very well

An analysis of existing networks, the participants and innovation tendencies, will provide leads for the composition of a transition network. Shadow networks can be important as cores of innovative thinking.

Transition processes cannot be managed through a hierarchal management model. The Dutch departments involved have often adopted a project structure, which operates outside the line organisation. A possible risk would be that the line organisation does not feel involved with transition management, which will make the part played by the departments smaller than is possible or desired. The Council advises to pay great attention to this organisation issue.

Recommendation 7:

For system innovations the not dominant knowledge is important. This means that the configuration of the knowledge(bearers) within a transition network should be different than that of the existing (policy)networks. Renewal is impossible without new, crosswise thinking, be it though this should be done to a limited extent to be productive. The process management must be given the authority to utilise new, possibly relevant knowledge.

Recommendation 8:

After the configuration of the participating parties is decided, for each transition casus there needs to be done a survey which intrinsic knowledge is needed with regard to a future vision as well as to clarify problems. This pertains to formal and non-formal knowledge. The research will often have to be **transdisciplinary**, in other words has to detect the knowledge questions of participants, and decide if new knowledge should be developed, and find multi- or interdisciplinary answers. Relevant informal knowledge must be traced.

Recommendation 9:

The role of national and local authorities :

The authorities involved in the transitions should play a stimulating and co-ordinating part. They are too carrying the ambition to effectuate a transition. The governments have a special task in creating appealing representations of the future as the core for a transition process.

The authorities involved are also responsible for the mapping of relevant informal and formal knowledge. Also, they must ensure that research is done into robust knowledge questions, as brought forward by the involved parties.

At a later stage the governments have other responsibilities, both in research (co financing experiments, demonstration projects), as in creating the necessary environment for the experiment (to lift restrictions, stimulate, subsidise, etc.).

Recommendation 10:

With regards to R&D-policy:

Stimulation of innovations with regards to transition to a sustainable development, will find its scientific justification in a demand driven model of innovation policy. The need and possibility of a demand driven innovation policy must be ascertained for each transition casus individually. Demand driven innovation policy requires different roles and a new kind of co-operation between governments, knowledge institutions and Business and Industry. The national government can stimulate new connections (nexuses), for example as is the case for ICES/KIS. Perhaps there are also possibilities on EU level to promote a demand driven innovation policy.

With regards to transitions in specific areas (agriculture, water), the stimulation of R&D in The Netherlands makes sense because of the specific strengths and innovative powers of Dutch researchers and/ or the relative lead they have within these areas.

It should be ascertained to what extent a demand driven innovation policy is stimulated or blocked by current policy instruments on national and international level (which is usually driven by offer?) and what kind of provisions can be made to stimulate it.

Recommendation 11:

Even though one should be aware that Dutch research and researchers can only contribute in a limited way to the realisation of transitions, it is nonetheless desirable to find out if and how Dutch researchers can play a part in an international context with regards to system innovations which seem to contribute to the desired transitions. This means that one will have to survey how the specific strengths of Dutch research can be utilised to the fullest. This requires a sort of observatory, which collects information on the progress of system innovation processes in the rest of the world and on the progress of relevant International research programmes like the Industrial Transformation Program by the IHDP (International Human Dimensions of Global Change Program).

Recommendation 12:

In shaping the transition process it is imperative that during the course of the transition time is set aside for reflection on the process itself and the targets, keeping sustainable development in mind. The process management had best rely on experts who have knowledge of processes of change in organisations and of knowledge management, of social learning or are qualified in an other sense

Transition processes as consciously? Desired social processes of change are new and for the most part terra incognita. They must be accompanied by scientific research, both of the process itself and as a means to generate intrinsic knowledge. The governments involved are jointly responsible.