

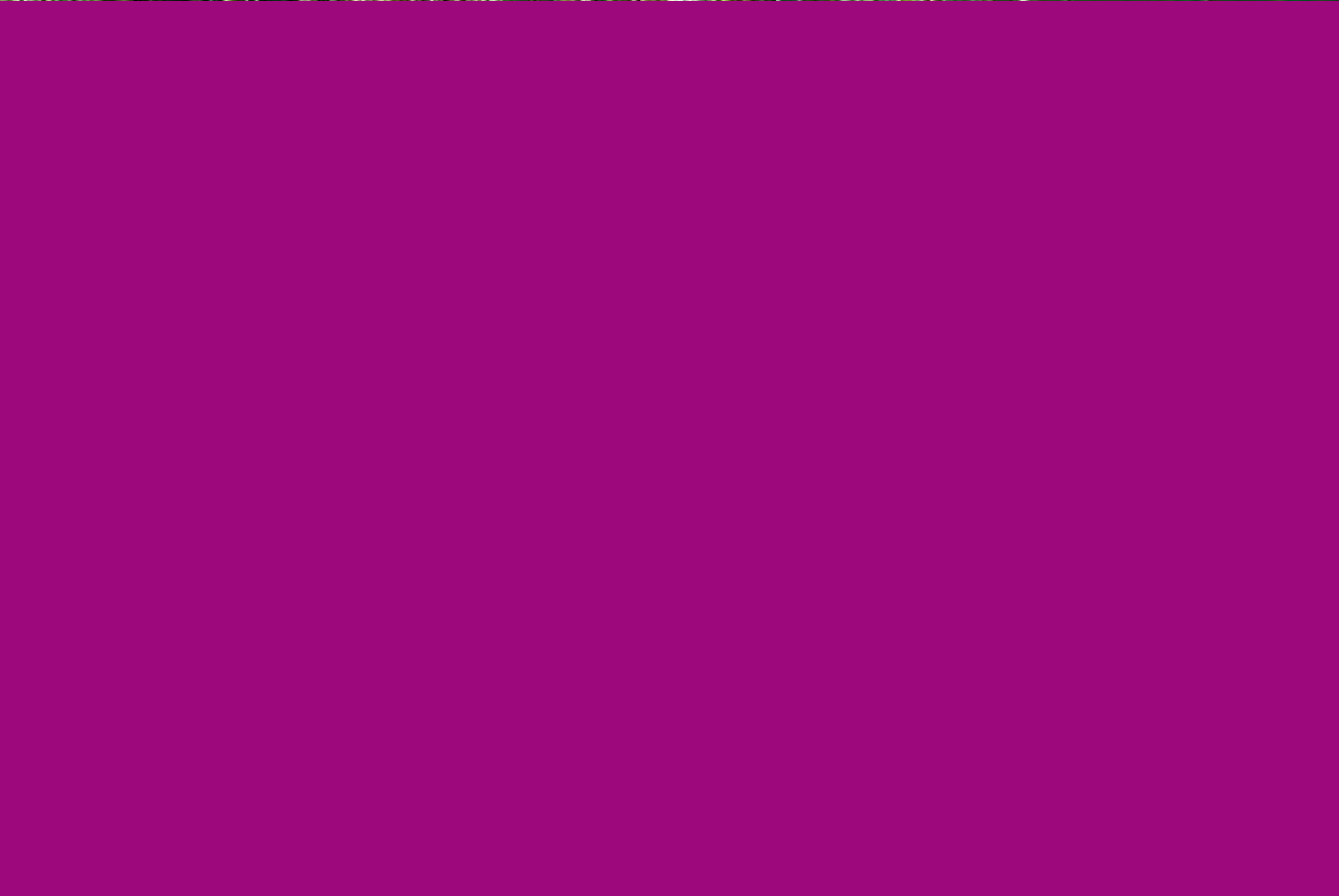
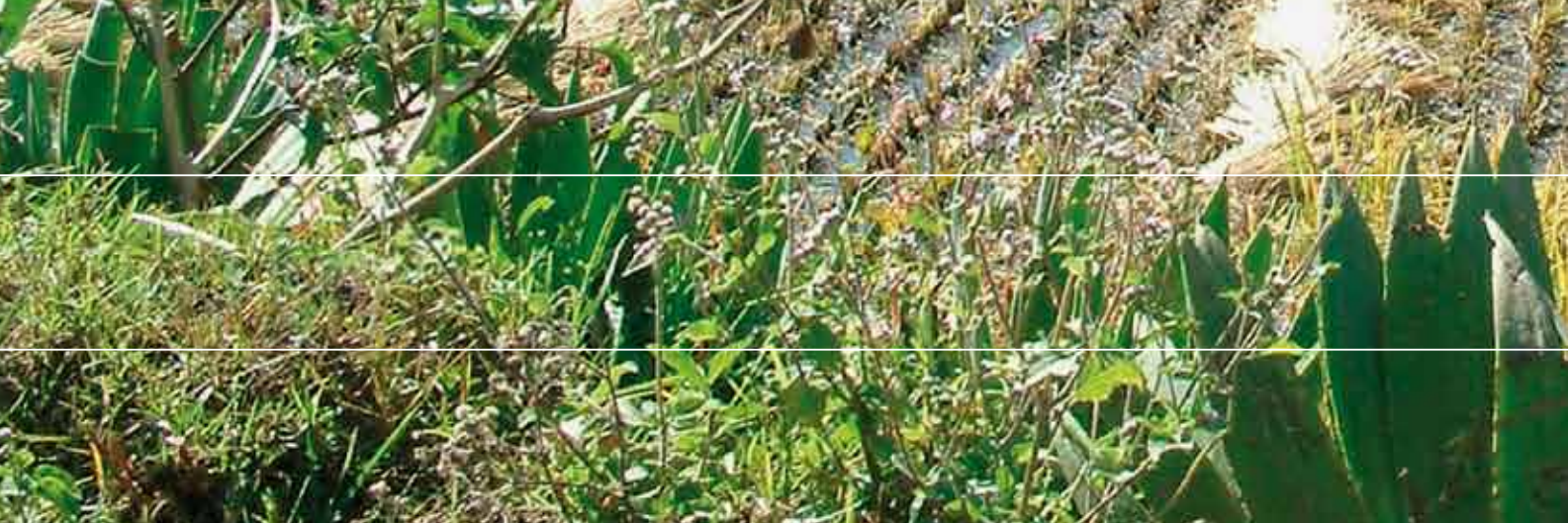
# Competing claims for land and water use outside of Europe



Congress Knowledge Base “Sustainable spatial development of ecosystems, landscapes, seas and regions”

Wageningen

1 September 2009



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# Knowledge Base: Innovative science for tomorrow's knowledge

Sustainable spatial development of ecosystems, landscapes, seas and regions in a changing world. That is the central subject of the Knowledge Base research programme KB1. Thanks to various successful initiatives taken by researchers, a lot of such research now happens outside of Europe. What is so special about these projects? Which strategic knowledge questions lie behind them? Why are they so characteristic of knowledge base research? And how can we reinforce the coherence between these various projects? Such issues will be debated at the second Knowledge Base 1 congress in Wageningen. The aim of the congress is twofold. Expertise from Wageningen in various research fields will be displayed. And new research questions for a medium long period will be formulated.

Coherence evolves from a common goal. As a major challenge for knowledge research, we have chosen the Millennium Development Goals that have to be achieved by 2015. Wageningen University and Research Centre is participating with both academic and practical, policy oriented research. The issue of competing land and water claims outside of Europe has been chosen as a central theme for the second Knowledge Base 1 congress. Lots of pressing questions are around. What would a sustainable world look like? What are the preconditions? How can a balance between People, Planet, Profit be found? Which scenarios have to be considered and how can they be realized? How to deal with the necessities of sufficient world food production, sustainable use of biodiversity and reduction of CO<sub>2</sub> emissions, all at once? Competing claims for land and water use underlie all these research questions. And this "Green and Blue Space" is a quintessential Wageningen domain.



# Welcome

“Worldwide, there are golden opportunities for enriching our own knowledge.”



*Kees Slingerland (Director General of the Environmental Sciences Group of Wageningen UR).*

Since this is our second Knowledge Base 1 congress, we might now call it a tradition. The term ‘Knowledge Base’ refers to the strategic research in Wageningen. Such strategic research is not just carried out at one’s own desk, but chiefly by discussions with others, exchanging points of view and visions. Today this will happen in a broad setting, with contributions from field experts both from Wageningen and elsewhere. The Green and Blue Space form a Wageningen domain par excellence. However, at today’s congress, external experts will have a large say as well.

In writing the programme of the Wageningen Knowledge Base research, we’ve got many degrees of freedom. We’d love to hear how the outside world regards our knowledge questions and ambitions. The discussions during our first Knowledge Base 1 congress last year and the reflections on our conclusions by Mrs. Anita Wouters, Director-General of the Ministry of Agriculture, Nature and Food Quality (LNV), have greatly helped

us in fine-tuning our KB1 agenda for the coming years. And we’d love to continue this process today.

Our present congress theme is the issue of the Green and Blue Space outside of Europe. Here, you’ll find tremendous problems, challenges and knowledge questions. Climate issues revolve around water, but they touch lots of other interesting aspects as well. Climate and water issues threaten large areas worldwide. Just like the Dutch, more than half of the world’s population lives in highly urbanized delta areas. Now that’s exactly where we find the most important food production, the richest biodiversity and the major economic values. That’s why discussions on climate and water issues gradually evolve into discussions about spatial issues. In the end, environmental planning should create new opportunities for optimal combinations of functions in order to guarantee a high-quality living environment. Why shouldn’t we grant every world citizen the same thing?

## *Why shouldn’t we grant every world citizen a high-quality living environment?*

The Dutch like to think they are very knowledgeable. And they love showing off their wisdom. But please let’s not forget the huge reservoir of relevant knowledge elsewhere in the world, which could greatly improve our own. The Dutch live in a river delta – Indonesia, however, counts no less than 6000 delta’s in all possible shapes and shades. The Vietnamese have brilliantly integrated their own know-how with international expertise. In the water basin of the river Nile, one notices an impressive balancing of interests between politicians and policy makers. In San Francisco and elsewhere in the US, golden opportunities show up for enriching our own knowledge. Let’s fine-tune our knowledge questions even more and try to word them even better, in order to contribute to a better living environment worldwide.

# Introduction to the congress

“Integrating knowledge about both physical space and human action is of vital importance for achieving our goals.”



Paul Opdam (Wageningen UR).

The Knowledge Base involves strategic research at Wageningen UR, by order of the Ministry of Agriculture, Nature and Food Quality (LNV), in close collaboration with many other parties, often by means of co-financing. The aims of the 2010-2013 period are twofold. On the one hand, we intend to do research that can be published in international top-class journals. On the other hand, we're preparing ourselves for tomorrow's knowledge questions, helping to solve future problems.

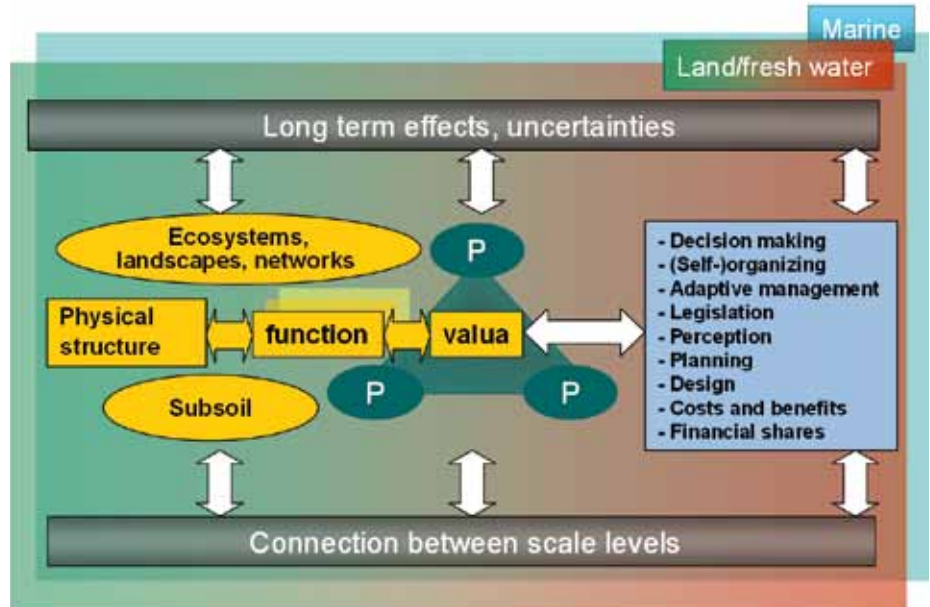
Sustainable development continues to be the *Leitmotiv* in our decision making on spatial planning. Climate change, urbaniza-

tion and other changes in land use are major drivers. In large parts of Europe and elsewhere, administrative decentralization is leading to big changes in the administrative organization.

*It is all about value – if there are no values involved, you need not bother at all*

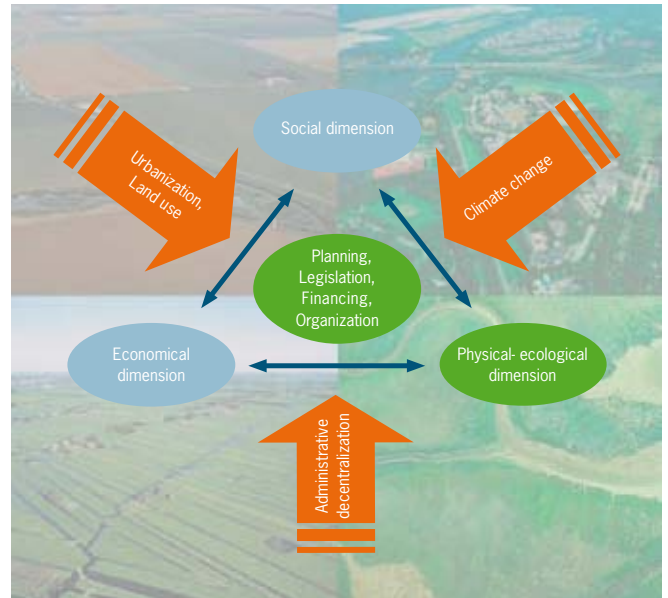
In the years to come, we'll place far more emphasis on integration of knowledge in order to truly realize our ambitions. We will be inclined to consider physical space as a social-economic system. After all, physical space is only part of the story. Inhabitants will react to a great variety of economic and social incentives. At the same time, adaptations to the physical space may create all sorts of economic, ecological and social values, which will be important to various parties involved. It is all about value – if there are no values involved, you need not bother at all. Who wants to invest in what? And who is profiting from what? These questions present themselves at various scales. In the near future, we hope to connect our knowledge of the physical system to our knowledge of human behaviour.





The KB1 programme has three focal points: Resilience, Ecosystem & Landscape services, and Domain knowledge & Knowledge exchange. Short-term and long-term interests need to be adjusted. Better integration of the various scale levels where researchers are active is another goal. Far more information – in Dutch – about these issues is available at [www.kennisonline.wur.nl](http://www.kennisonline.wur.nl).

KB1: Sustainable development of space.



# “Knowledge and policy making questions on sustainable land and water use”

Which policy themes are leading in the international political debate?



*Henk de Jong (Deputy Director of International Affairs at the Ministry of Agriculture, Nature and Food Quality, LNV).*

In 2050 our planet will count 8 billion people. Meanwhile prosperity is increasing, particularly in Asia. The growing demand for food, water, raw materials and energy puts more and more pressure on environment and biodiversity. Our ecological footprint and our land claims keep growing. Climate change is in part driven by economic development. Worldwide, about 1.8 hectare of farmland is available for each inhabitant of the earth. The average Dutchman claims 4.4 hectares on average, the average American needs 9.6. The present Chinese use of 1.6 hectare per inhabitant is not excessive. But if the

Chinese were to increase their standard of living to the American level, then China would need the entire world's available farmland for itself. This distribution problem is causing growing political tension between north and south, east and west, but also at a local and regional level.

The depletion of fossil fuels leads to geopolitical efforts to take up stronger strategic positions in the energy market. For instance, the ministry of LNV is expanding its activities in North Africa. Its aim is to obtain access to the North African gas supplies, in exchange for assistance in raising the level of food security.

*In the future, the Netherlands will no longer lay down global standards*

Meanwhile, the global power balance is shifting towards Asia. In the future, the Netherlands, as a small western country, will no longer lay down global standards for other countries. Besides, global systems will become more and more dynamic and unstable, partly due to climate change and inconstant food prices.

Solutions that are contributing towards sustainable development should do justice to both ecological and socio-economic objectives. People, Planet, Profit is the leading concept. Agriculture and its spatial claims are part of the problem, but part of the solution, too. In order to find practical solutions, adequate knowledge should be developed.

The Dutch Directory of International Affairs of the ministry of LNV invests € 6 million annually in policy oriented research. This involves, for instance, providing data for the UN Commis-

sion on Sustainable Development (CSD) and for major climate conferences, as well as bilateral cooperation projects. A key factor for success is an intensive dialogue among all concerned. This may involve local authorities and companies, as well as scientists from Wageningen.

### *I am advocating a more intensive dialogue between the ministry and the Wageningen University and Research Centre*

That's why I am advocating the necessity of a more intensive dialogue between our ministry and the Wageningen University and Research Centre. Mr. Krijn Poppe has been appointed Chief Scientific Officer in the field of economics. But it would be a good idea to have more dialogues in the scientific field as well. Together we may identify the right knowledge questions, design suitable research programmes and find better ways of implementing knowledge successfully.

Our policy making spearheads are increasing the sustainable agricultural productivity and food security in North Africa and improving land and water management. In Ethiopia, small farmers using surface irrigation turn out to be the biggest water consumers. The best way of improving the water system is by assisting these smallholders in developing more efficient irrigation techniques. Vietnam is an example of a country with very different problems, in particular flash floods. As a consequence of climate change, the water level can rise eight to nine meters in just a couple of hours.

### *In order to feed 8 billion people by 2050, we'll need a knowledge-intensive, sustainable agriculture*

Internationally, the consumption of animal proteins is not as hotly debated as in the Netherlands. Production of one kilogram of animal protein claims far more land than the production of a kilogram of plant protein. If both the world population and our



A good example of policy oriented research, financed by a public-private partnership, is sustainable tea production in Kenya. In the 'Sustainable Tea Development' project various parties are cooperating, from small farmers, Unilever and the Lipton Tea Company, to ministries, knowledge institutes from Wageningen, and NGOs, for example the Rainforest Alliance. Together, they are building a sustainable tea production chain, supported by the extensive Wageningen-based knowledge of the production chain, of physical space and water use.

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prosperity keep growing, we are heading towards a gigantic shortage of arable land. On the other hand, not all present pasture land would be suitable for crop production, if only because of lack of water. So this question needs a thoughtful debate.

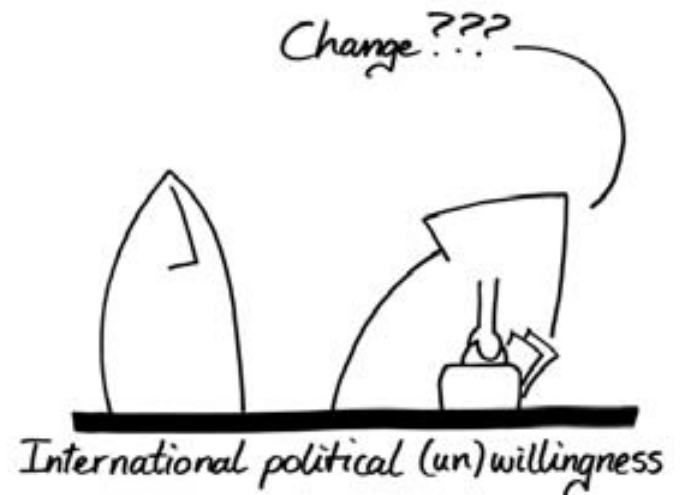
The recent report “Schaarste en Transitie” (Scarcity and transition) by the Dutch Council for the Sustainable Environment, an advisory council for the council of ministers, deals with knowledge issues within the scarcity triangle of food, water and energy. The discussion involves a better understanding of scarcities in their context. This report also draws attention to the growing dynamics and instability of economic and other systems.

How can transitions be accelerated? That’s an important question. From the Netherlands to Africa or Asia, the answers will be different everywhere. A key role has been reserved for the Wageningen knowledge base. Smaller land use claims can only be achieved by a high tech, eco-efficient agriculture.

Judging by the hotly debated pig flats, this issue involves all sorts of public points of view. Africa is in need of small-scale, knowledge-intensive, sustainable agriculture. At a political and public level this may call for even larger changes than at a sheer economic and technological level. Just think about educational institutes, public investments, social structures, traditional methods of water use, access rights to water and the need of building up buffers for future droughts.

### *The real problem is lack of international political willingness*

Bringing about so many changes will be a huge and complex challenge. But it has to be done, in order to allow the earth to feed 8 billion people by 2050 and still find enough space to preserve biodiversity. If we stick to our present path, we’ll end up with tiny scraps of nature reserves only. As for our ability to generate the appropriate knowledge, I am fairly optimistic. The major obstacle is the lack of international political willingness. Science can contribute greatly to the necessary consciousness-raising by convincing people that change is necessary indeed.



# “Competing Claims for Land and Water in Changing River Deltas”

Issues for Research and Knowledge Partnerships to Improve Investments



*Wouter Lincklaen Arriens (Lead Water Resources Specialist, Asian Development Bank).*

The role of banks is changing. Banks are no longer just lending out money, but more and more often they are intermediaries in developing knowledge, too. This intermediary role both in financing and as a knowledge broker is an explicit part of the role of the Asian Development Bank (ADB) strategy up to 2020. That's why the ADB is supporting the Development of so-called 'Knowledge Hubs': regional networks, e.g. regarding water issues, in cooperation with many parties. Wageningen is increasingly focusing on *science for impact*. That's why ADB

partners are greatly interested in the Wageningen expertise in water management. They are eager for collaboration. Our various knowledge networks offer great opportunities.

Although present policy makers pay a lot of attention to Africa, in fact the majority of the world population lives in Asia. What Asia does – or doesn't do – has a tremendous impact on the world. Besides, Asia is the source of a lot of innovative thinking. These days we can see the Dean of Harvard University and

other centers of excellence coming to Singapore to find out what's going on here. Many large international companies are relocating their R & D divisions to Singapore and other places in Asia – a very interesting trend. These are signs of a fundamental global power shift.

### *More and more often, our clients are asking for money and knowledge*

The ADB was established in 1966. Its most important objective is poverty reduction by providing financial and technical assistance. We have 67 member states, including 48 in the Asian-Pacific region. Contributors are entitled to participate in our projects. Between 2005 and 2008, our volume of lending has increased from 6 to 11 billion US dollar annually. Environmentally sustainable growth is very much at the heart of our thinking. Nowadays, our role as a development bank is changing. Apart from being an intermediary in financing projects for development and poverty reduction, our new strategy up to 2020 is to be an intermediary for knowledge as well. In fact, our clients are increasingly asking for money *and* knowledge, including capacity building. Our Water Financing Program includes loans for rural and urban water management projects, technology assesment, grants and guarantees and support to regional water knowledge hubs.

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For water projects, contributing ADB member states so far have committed 43 million US dollar in the *Water Financing Partnership Facility*. The Netherlands and Australia are among the largest donors. Other financial support is provided by Spain, Austria, Norway and other countries. We are investing in various water projects for *rural, urban and basin water*. In rural areas we are investing in health care and a better standard of living, for instance by better irrigation techniques. In cities we support sustainable growth, for instance by providing sanitation. At basin water level we invest in integrated water and river management and in adaptation to climate change.

We are also engaging ourselves in arranging water management summits, not just for water experts, but also for Asian -



Pacific prime ministers, finance ministers and ministers of environmental affairs, who are dealing with water management. We are especially trying to reach out to leaders outside the water sector proper, since many important decisions about water management are in fact taken outside the water sector. An important new initiative is the Ministers for Water Security Initiative, a special summit about water affairs for safety ministers.

### *Model designers should show their models to policy makers in as early a stage as possible*

Since many countries in our region are facing the same problems and challenges in water management, in 2003 the Asian Pacific Water Forum (APWF) was established. Here, we are talking about three key themes: water financing and capacity development, disaster management – which is extremely important in the Asian - Pacific region and the blue - green interface which we call 'water for development and ecosystems'. The APWF maintains an extensive water knowledge network, with various regional hubs, so called *knowledge hubs*. The metaphor of the *hub* as a central place of interchange stems from the aviation world. A hub is a place you go through in order to get to your final destination. There is a lot of knowledge in Asia, but unfortunately it is rather fragmented. That's why some acknowledged top institutes are now fulfilling a role as

knowledge hubs. They adopt specific knowledge problems – for instance, groundwater pollution – and they maintain a regional knowledge network around this theme.

The ADB supports regional cooperation via various stakeholder knowledge networks, among them a special network for the media (*Asian Water Wire*), as a service to journalists, many of whom are no specialists in the complex issues of water management. Another big sponsor of these knowledge networks is the UNESCO-IHE institute in Delft. The UNESCO-IHE is very well-known in Asia. Many people are in touch with it or have studied there themselves. The Dutch water expertise has an excellent reputation in Asia. However, the name 'Wageningen' is not quite as well-known to the Asian water manager. That's why research centres from Wageningen ought to promote their activities as part of the Dutch water initiatives. In Asia, people tend to attach great importance to large, internationally acknowledged knowledge institutes.

Engineers from Wageningen are in a unique position to deal with complex bottlenecks in Asia. First of all, there's the irrigation issue. Failing bureaucracy contributes to serious groundwater shortages. Deltas are extremely vulnerable to climate change. Wageningen experts are in a unique position here, thanks to their famous multidisciplinary approach. They know that irrigation issues should not just be considered as merely technological questions, but must be considered in a broad context. Such experts are very scarce. Many innovations that have been introduced in recent years have definitely not lived up to their expectations. Dramatic changes are necessary here. We should return to the drawing board in order to design small and medium scale irrigation systems, with quite a different management system. Which kind of support do small irrigation schemes need from the authorities in order to make irrigation both effective and efficient? Model designers should

show their models to policy makers in as early a stage as possible.

The quickly expanding cities are hampered by bad water supplies, poor sanitation and very severe pollution. Incredible though it may seem, half the people in Asia have no sanitation. Wastewater and sewage treatment are quite inadequate. Coastal cities are threatened by floods. In spatial planning, integral development programmes are necessary in order to realize comprehensive, adequate sanitation systems in existing and new districts, 'from toilet to river', in order to keep both the cities and their downstream areas livable. In large parts of Asia, pollution from urban areas is nowadays – in volume – a greater source of river pollution than agricultural effluents.

Integrated water and river management has its own challenges. Here, my most important recommendation is analyzing former projects. How effective was their approach? How satisfied were the stakeholders? In how far did the projects fit in with the concept People, Planet, Profit? We've got to identify the key factors to success.

*Prove your expertise by showing off your most successful projects. This has a quick and powerful lever effect*

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Finally, I would like to advise you to take stock of the strongest sides of Wageningen water research and to concentrate on the aspects that you are really good at. Prove your expertise by showing off your most successful projects. This has a quick and powerful lever effect. Besides, you might wish to explore co financing opportunities to support research collaboration in priority themes and locations.



# Conceptual framework for conflicting land use



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*Jetse Stoorvogel (Associate prof. of Land Dynamics, Wageningen University).*

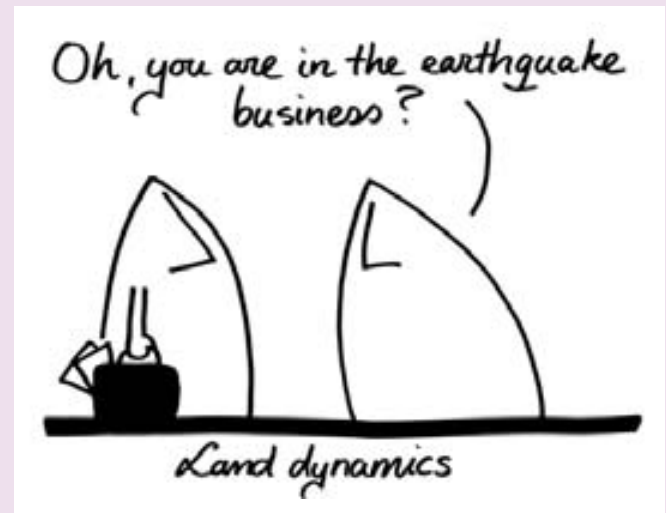
Land dynamics is not yet an established phrase. Most specialists in land dynamics have originally been trained as soil scientists. Gradually, experts felt an increasing need for a wider scope on the regional landscape, including both physical and socio-economic aspects of land use.

Two large research programmes in which our Land Dynamics Group and various partners are involved are the programmes on 'Competing Claims on Natural Resources' and 'Trade-off Analysis'. The first questions are always the same: Which spatial interactions are going on here? What do the inhabitants of this region want? Which effects do activities at location A have on location B and the other way round? For instance, the use of pesticides at the upper course may result in deterioration of the water quality further downstream, with possible repercussions on drinking

water and irrigation water quality. This is an example of a one-way effect, but two-way effects do occur as well.

Establishing a national park for nature protection by superior order could result in a massive migration towards neighbouring regions that were already densely populated and under high pressure in the first place. For the establishment of the Greater Limpopo Transfrontier Park, at the border of Mozambique, Zimbabwe and South Africa, 20.000 people had to be resettled. Meanwhile, there are large foreign investments in large sugar cane plantations for bioenergy and sugar production in the same region. Conflicting land use is ubiquitous.

Our research into farming styles involves both spatial and temporal developments. In a country like Senegal it can be anticipated that climate change will make agricultural production increasingly difficult, finally resulting in land degradation and desertification. However, in case of proper land use, paying careful attention to the organic matter supplies of the soil, developments might be quite different and agriculture could be sustainable.



Multifunctional land use is rapidly growing. Next to primary agricultural production, various other elements are important, such as water services, CO<sub>2</sub> fixation and – in particular in more developed regions - protecting cultural historic values of the landscape.

In South Africa, our Land Dynamics group participated in research on land use and water supplies, commissioned by the Council of Johannesburg. This city draws its water supplies from a storage reservoir. The Royal Natal National Park lies upstream. Further downstream, you'll find, in succession, communal grazing lands, small scale mixed farming, large scale rangeland, large scale irrigated farming and finally the Woodstock dam and its storage reservoir, providing drinking water for the city of Johannesburg. In order to keep up its drinking water supplies, the City Council is willing to compensate farmers in the Tugela water shed area for providing water services, in exchange for a more efficient production, making more economical use of water supplies. Our group has studied the most effective way to pay these farmers and its consequences in terms of resulting water supplies. We found that farmers, given the opportunity, are willing to make better use of water supplies anyway, even if they don't get paid for doing so. The more the financial reward increases, the more farmers will join in. However, we found that beyond a certain financial upper limit, water efficiency will increase no further, no matter how much you are willing to increase payments for participation.

### *The time scale deserves more attention*

In studying farming styles, the time scale deserves more attention. Developing long term views for a certain region calls for quite a different style of research from developing a short term view on assigning land use.

As soon as research conclusions about land use are extended from the individual farm scale to the regional scale, things rapidly get more complicated. One has to take villages and industries into account. A country like Kenya counts 1300 inhabitants per square kilometer. Even if individual farmers succeed in making a living here, their production methods

would definitely be inadequate at a national level. Alternative sources of income will have to be found.

Our group has developed various alternative poverty reduction scenarios for Kenya. First of all, we have studied several agricultural development programmes. For instance, we calculated the results of making more efficient use of manure, providing crops with extra nitrogen. Previously we had predicted that this would be highly beneficial to the regional agricultural production. In practice, however, the effect was rather disappointing. As soon as these farmers got access to more manure, they would switch to growing maize, since such a cash crop is far more profitable. Unfortunately, more than half the years proved too dry for growing maize. So the economic situation in the region did not improve after all. Land users may not react to economical stimuli as predicted. That's why regional development programmes will not always reach the appointed goals.

### *We should stop making our models forever more complicated*

Before designing a model for sustainable development, researchers should learn the art of identifying the key factors in the present economic development. However, one has to be cautious. Scientists tend to make their models increasingly big and complicated, feeding them more and more data. Frequently, it takes about three years to get such models ready for operation in a given situation. That's overshooting oneself. In practice, the simplest, plainest models are used most often. And in many cases their users don't remember the original underlying premises. Besides, we'll have to find better definitions of how to value the various aspects of sustainable development.



# Stumbling blocks and opportunities in transdisciplinary research



*Annemarie Groot (Centre for Water and Climate, Alterra).*

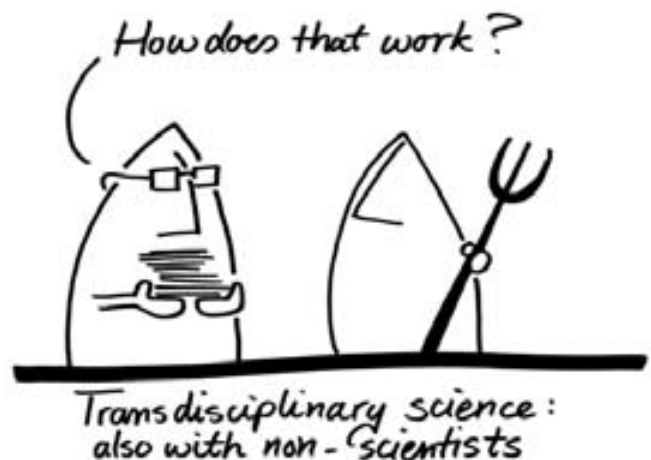
14 'Transdisciplinarity' is a new buzzword in science. In fact, Wageningen has a long tradition in this field. Scientists from various alpha, beta and gamma disciplines are not only working together in a scientific setting, but also taking into account the knowledge and needs of various other parties such as farmers, local authorities and NGOs. However, there is room for improvement. Alterra is exploring the necessary theoretical concepts and methods.

This method of knowledge management is fundamentally different from the usual ways. In transdisciplinary science, all parties involved are knowledge bearers and knowledge providers. This approach is particularly suitable for social issues with many actors and a large share of knowledge uncertainties, conflicting interests and conflicting values. Besides, collaboration with social parties will improve the chances of successful implementation of the outcome of the research programme into society and thus contribute to innovation.

Up to now, however, the role of non-scientists in formulating research questions has been limited. In the first place, it's a tough job for non-scientists. Besides, the present financial structures don't allow much room for non-scientists on the payroll. Anyway, transdisciplinary science makes use of unique knowledge about ecosystems and local structures and such knowledge could never have been obtained without the input of non-scientists.

*Transdisciplinary science results in unique knowledge that would never have been acquired without the input of non-scientists*

In fact, scientists do have a long tradition of collaboration with non-scientists. Experience shows that it is far from easy. That's why our research group is now doing methodological research. What are the different practices, what are the advantages and





disadvantages of this method? About such questions 15 scientists from Wageningen University and Research Centre have been interviewed.

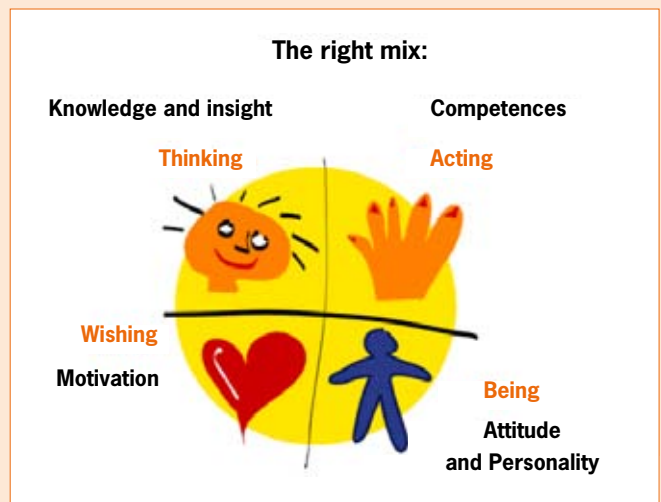
In order to profit more from transdisciplinary research, more scientific research will be necessary. One of the stumbling blocks is the fact that transdisciplinary research tends to get stuck in case-specific knowledge. But if the results of the projects are to be published in scientific journals, it will be necessary to develop more explicit generic knowledge as well. A good approach is looking at the conclusions and wondering in how far they would be relevant to outsiders as well. Taking this learning process in hand will give our knowledge even more impact in society. Integration of concepts and methods is sorely needed if we are to solve complex public issues.

Our ideas about science and the best way to do scientific research are changing all the time. Trends move from mono- by multi- and interdisciplinary research to transdisciplinary research. Good transdisciplinary research includes good monodisciplinary and interdisciplinary research. Rather than splitting up complex issues into separate parts, we ought to start tackling them in all their complexity, including a vast array of actors, conflicting interests and conflicting values. Not until scientific knowledge is being successfully applied in society can we really talk about innovation. Innovation calls for integration.

### *Innovation calls for integration*

Many Wageningen scientists working outside of Europe have strong normative motives. They really want to make themselves

useful for society and they expect that transdisciplinary research will make their scientific results more useful and more relevant. Being foreigners in an unknown cultural context, they prefer a modest attitude. They don't want to feel superior to the people involved in their studies, but instead treat them in a democratic way, like equals. The WOTRO, a part of the Netherlands Organisation for Scientific Research, is an organisation that welcomes this attitude. Nowadays, the WOTRO provides some financial support for methods of developing scientific research questions in collaboration with non-scientists. However, many stakeholders who are involved in conflicts of interest are not primarily aiming at participation in scientific research. Their first urge is getting their own interests into the spotlights. On the other hand, without enough interaction with stakeholders, the research may not result in enough innovative knowledge. Some Wageningen scientists observe a lack of supporting theories and methods. Besides, they find it hard to make generalizations from case-specific knowledge. But good scientific research can be published anyway. It is a great challenge for our Knowledge Base programme to stimulate the integration of knowledge, at the level of methods, theories, bridging concepts and the final 'products' that the research will yield. This is the only way to move forward.



# Theme 1: Land use and climate change

*Henk Wösten (Alterra), Jolanda van den Berg (LEI), Jan Verhagen (PRI) and Peter van der Meer (Alterra).*

Worldwide, land use changes are driven by many factors, such as population growth, fluctuating prices of agricultural and forestry products, economic growth, poverty, political and institutional factors. In addition, climate change, for instance through mitigation and adaptation strategies, is likely to affect land use planning over the coming years. Forests are disappearing and there will be a substantial increase in the areas of marginal arable crop lands and so-called wastelands.

In Indonesia for instance, forest areas have decreased from 130 million hectares in 1975 to 86 million hectares in 2004. In the same period the areas of arable land only increased from 38 to 48 million hectares. Remarkably, the areas of palm oil plantation increased particularly quickly, from 0.2 to 6.1 million hectares. Partly due to the increasing demand for palm oil as a biofuel, the Indonesian CO<sub>2</sub> emission might increase with circa 590 ton CO<sub>2</sub> annually. Further increase of the palm oil production will lead to even more pressure on existing forests and peat lands and extra CO<sub>2</sub> emissions. Alternatively, production intensification will focus on better use of existing wastelands.

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A key question is whether palm oil production will contribute to economic development at a local and regional level. Funding mechanisms for climate change mitigation, such as REDD (*Reduced Emissions from Deforestation and Forest Degradation*), *carbon credits* under the Kyoto Protocol and *biorights* could provide interesting alternatives for local people. Such funds could help local people make a living from conserving forests and peatlands.

Making a Master Plan for restoration and revitalisation of the degraded large-scale Mega Rice Project area in central Kalimantan, Indonesia, is illustrative for the search for a balance between People, Planet and Profit. The big challenge is to combine the realisation of two Millennium Development Goals at once: Reduction of poverty and hunger (goal 1) and Sustainable use of natural resources (goal 7), rather than getting trapped into a situation where both goals are conflicting.

## Theme 1, from the discussion:

- How will climate change influence migration patterns?
- How can mitigation and adaptation measures best be combined in our present land use?
- How to get changing land use on the political agenda?
- What's the causal connection between climate change and land use?
- REDD is based on difference in affluence – how long will it work?
- How to connect climate and sustainable development (process, methods, tools?)
- How to make sure that REDD money gets to the right destination?
- Fragmentized Wageningen UR knowledge should be integrated in order to develop a Wageningen UR approach of REDD methodology for a KB1 project in Kalimantan.



# Poster Theme 1: Land use and Climate change

Henk Wösten, Jolanda van den Berg, Jan Verhagen and Peter van der Meer

## Worldwide land use changes are driven by:

- Population increase
- Fluctuating commodity prices
- Economic growth
- Poverty
- Political and institutional factors

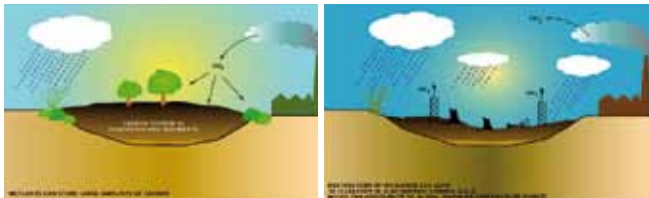
In addition climate change, for instance through adaptation and mitigation strategies, is likely to affect land use planning over the coming years.

Thus far these changes have led to decrease in forest areas, marginal increase in agricultural land and substantial increase in waste lands.



*Oil palm cultivation areas expand rapidly.*

Expectations are that increase in the demand of oil palm as biofuel will put more pressure on forest areas and peatlands leading to extra CO<sub>2</sub> emissions. Alternatively, production intensification will focus on better use of existing waste lands.



*Drainage transforms peatlands from a carbon sink to a carbon source.*

Key is if economic development at local and regional level will be promoted by oil palm expansion or that funding mechanisms for climate change mitigation such as REDD and carbon credits are interesting alternatives for the local people.



*Alternative funding mechanisms bring new opportunities.*

The challenge is to combine the realization of Millennium Development Goals 1: Reduction of poverty and hunger, and 7: Sustainable use of natural resources, instead of getting trapped in a situation where they oppose each other.

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*How can local people benefit best?*

# Poster Theme 1: Land use and Climate change - *Knowledge issues*

Henk Wösten, Jolanda van den Berg, Jan Verhagen and Peter van der Meer

## Knowledge question

### People

- What are the impacts of climate change, increasing pressure on food security and local economy, caused by climate change, for vulnerable, local people?

### Planet

- How to combine the various biophysical components to support climate-proof policies, plans and activities, taking into account the socio-economic context?

### Profit

- Who owns the carbon supply in the existing tropical peat swamp forest ecosystems? Who should receive the REDD-payments: local communities, administration of concessionaries?

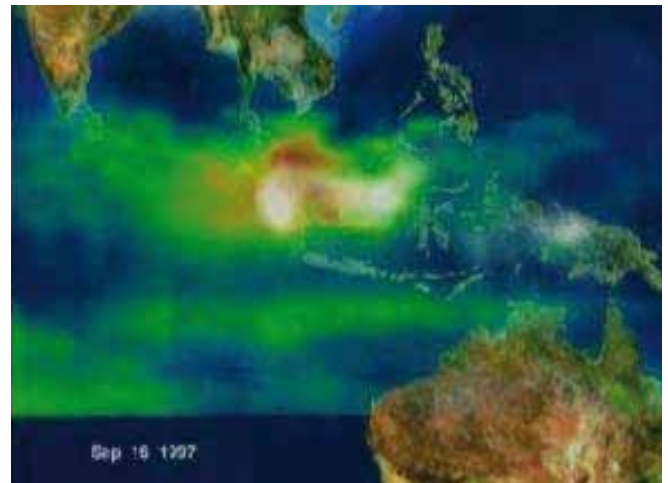
## Motivation/explanation

Often, the poorest people in the poorest countries suffer most from climate change.

The various disciplines (hydrology, agriculture) do not always link up. That's why demonstrating spatial connections can be hard.

Everyone is talking about REDD, but will it really happen?

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# Theme 2: Land degradation and desertification

Coen Ritsema, Simone Verzaandvoort and Rudi Hessel (Alterra), René Verburg, Irina Bezlepina and Jolanda van den Berg (LEI), Leo Stroosnijder (Wageningen University, Land Degradation and Development Group).



Land degradation and desertification cause loss of biological or economic productivity from the land. This is a complex, global issue, caused by a changeable mix of social, economic, political and natural factors, such as high population pressure and non-sustainable land and water use.

Advancing desertification threatens the existence of over 250 million people. The so-called drylands take up over 40 percent of the earth's surface. Over 35 percent of the global population lives in *drylands*. 10 to 20 percent of the drylands suffer from desertification already. By climate change the frequency, length and severity of existing drought periods will increase and new droughts will come up.

Desertification can show itself in many ways, such as erosion, floods, overgrazing, deforestation, drought and salinization. Often, desertification hits inhabitants of the third world people hardest, since many of them have few alternatives for making a living. Desertification can lead to loss of income and employment, food security and health and thus cause more migration.

The *millennium ecosystem assesment* led to new initiatives. Worldwide, some 40 large international research projects are dealing with desertification. The emphasis is on monitoring and modeling, with far less attention being paid to prevention and raising public awareness and public support.

Measures taken against desertification often have a social component, too. They can contribute to regional development. In particular, fragile arid and semi-arid ecosystems deserve an integral approach to protect them from further degradation. That's why we should develop alternative types of land use and land management, based on participation from scientists and stakeholders.

The EU project DESIRE aims to find measures for beating desertification and land degradation, in cooperation with stakeholders. Worldwide, 16 research areas have been selected and together they form a complete picture of the problem.

Researchers from Wageningen are working on various DESIRE projects, joining in with local community strategies to stop desertification, such as building stone walls, making compost and planting Eucalyptus. Scientists check whether this will really work. For instance, they are studying more efficient rainwater use, a better water storage capacity of the soil and more efficient water uptake by crops.

## Theme 2, from the discussion:

- More serious studies into salinization are needed.
- It is remarkable that Dutch scientists are experts in desertification.
- How can scientific research facilitate a meaningful commitment from stakeholders?
- What is the influence of changing consumption patterns on land use?
- The Wageningen UR is good at system thinking; let's make the most of it.
- Researchers should not only focus on deltas, but even more on the 'hinterland', in order to reduce migration flows towards the cities.
- Recent research shows that 24 percent of degraded lands are deteriorating, but 16 percent are improving, by unknown causes.
- More research is needed into the strong regional differences between drivers of desertification.
- Temporal variability can obscure observations (e.g. in the Green Sahel in the 90s).
- Projection of some moral standards from the western world can lead to wrong representations. For instance, NGOs – by mixing up environmental and food security issues – might be opposed against the use of fertilizers.
- Desertification should be connected with the food security discussion.
- What is the effect of the Dutch agro-industry on land degradation?



## Poster Theme 2: Land Degradation and desertification

Coen Ritsema, Simone Verzandvoort, Rudi Hessel, René Verburg, Irina Bezlepkina, Jolanda van den Berg and Leo Stroosnijder

### In search for remediation on the ground

Land degradation and desertification imply the reduction of ability of land to provide ecosystem services vital for human existence, specifically in dry areas. Causes derive from combinations of social, political, economic and natural factors which vary from region to region. Examples are population pressure or policies leading to the unsustainable use of water or land.

Scientists believe that 10 to 20% of the world's drylands are affected by desertification (MA, 2005). There is a great deal at stake - safeguarding the livelihoods of more than 250 million people living in dryland regions. But the crucial question is: can desertification, initiated and exacerbated by climate change, be remediated?

The largest international initiative for remediation is the UNCCD. It has yielded limited results in the past decades, and needs support from science in guiding the way to getting remediation strategies implemented on the ground.



Local solutions should be the departure point for reaching success in remediating desertification on a global level.

Sound scientific evidence of implementation on the ground is required for an increased public support for and investment in the mission of the UNCCD.

Support and political commitment to institutional reforms at national and international levels are key to combating desertification.

Research projects from Wageningen UR have strong characteristics to help remediation on the ground:

#### **Stakeholder involvement**

Stakeholders addressed include land managers, local scientists, regional governments and policy makers. Land managers are involved at various levels of the research (identifying, selecting, trialing remediation strategies, dissemination). The UNCCD is addressed in the DESIRE project.

#### **Policy effects**

Policy effects are incorporated and quantified in modelling frameworks (DESIRE, LUPIS) to assess effects of remediation strategies.

#### **Capacity building**

In all projects, local scientists and land managers are trained on aspects of sustainable land management, in using models and in facilitating stakeholder meetings.

#### **Variety of instruments**

A variety of instruments has been developed and applied in WUR projects: participatory methods for identifying, documenting and selecting SLM measures, for land use planning, and modeling frameworks to assess the effects of SLM strategies.

#### **Integration**

WUR projects in LDD research have a strong focus on the integration of different domains within science (biophysical/technical vs socio-economical), the use of indigenous knowledge on SLM strategies, and the integration between scientists from developed and developing countries.

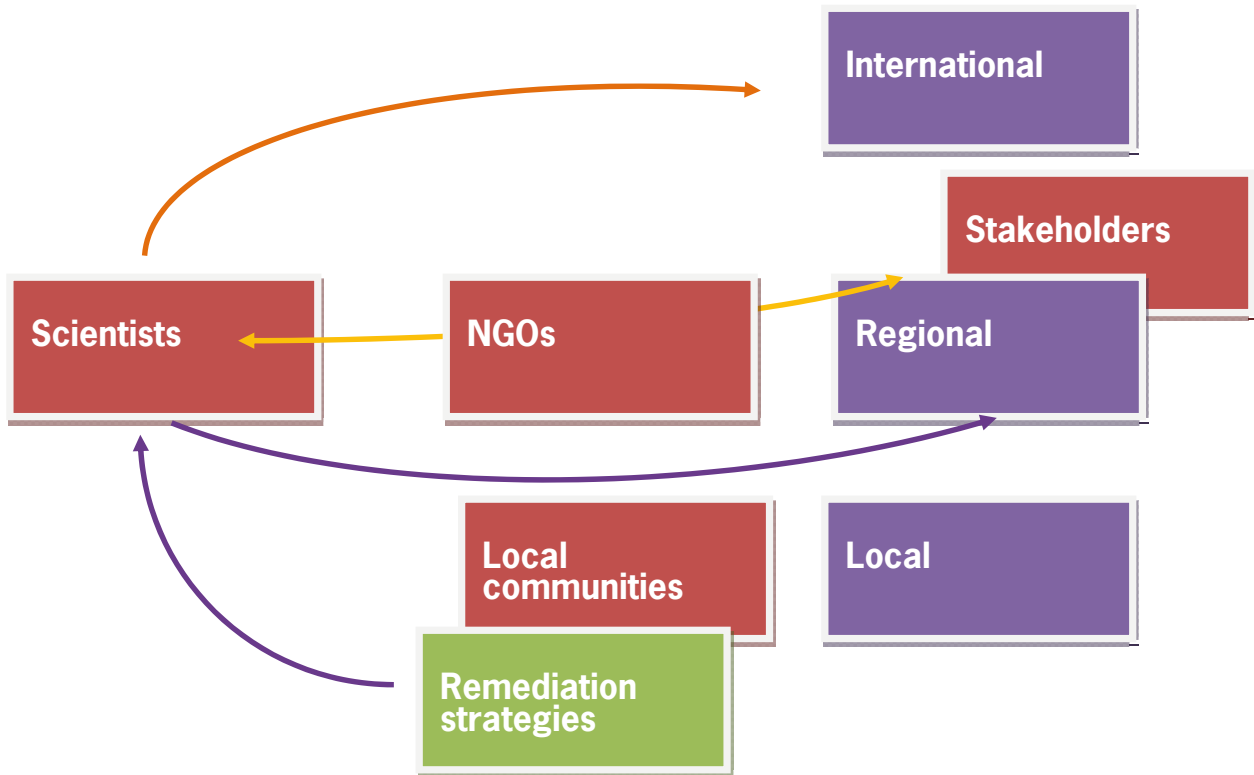
#### **Upscaling**

DESIRE is one of the first research initiatives upscaling biophysical and socio-economic assessments of remediation strategies to regional and global scales.

## Poster Theme 2: Land Degradation and desertification - Knowledge issues

Coen Ritsema, Simone Verzandvoort, Rudi Hessel, René Verburg, Irina Bezlepkina, Jolanda van den Berg and Leo Stroosnijder

- Use strategies developed by and with local communities
- From there, up to higher levels: modelling effects of remediation strategies or policy AND reaching stakeholders
- Establish and maintain during relationships between stakeholders and scientists: a catalyst role for NGOs



- Use of indigenous knowledge, inclusion of policy, dissemination
- Scientific activities (data collection, processing, modeling)
- Dissemination, education

# Theme 3: Biodiversity, land and water use

*Eric Arets, Rob Jongman, David Kleijn, Peter van der Meer and Bas Pedrolí (Alterra), Cora van Oosten (Wageningen University) and Irina Bezlepina (LEI).*

The growing world population and the increasing prosperity stimulate the demand for food, energy and raw materials. This results in competing land claims for food, biofuels and other important 'ecosystem services'. Such 'green' and 'blue' services carry an increasing weight in comparative assessments of economic rationalism (what should be produced where against minimal production costs?) and possible consequences for nature, biodiversity, landscape and environment. More and more often, companies and administrators reach agreements on more sustainable production and trade. Examples are the Roundtable Conferences on Sustainable Palm Oil and Soy. Agreements on High Conservation Value Areas (HCVAs) will contribute to the protection of ecologically vulnerable areas. At the same time, there is a growing interest in social-cultural values, which may greatly vary between countries or sections of the population. This might contribute to the increasing tension between agricultural production on the one hand and biodiversity, environment and water supply on the other hand.

The big challenge is learning to produce all necessary biobased products without damage to important ecosystems, essential goods and ecosystem services, such as CO<sub>2</sub> fixation, availability of fresh water, clean drinking water, fertile soils, fruits and other food, clean air and biodiversity. Another important question is

how to prevent the undesirable feed-back mechanisms which sometimes unexpectedly occur if too much attention is being paid to one claim only.

## Theme 3, from the discussion:

- How to raise interest among authorities and institutions in a sustainable use of ecosystem services?
- We need a better understanding of ecosystem processes and effects of land use on biodiversity.
- Which biodiversity indicators are necessary for judging the consequences of biodiversity losses?
- We need more knowledge about extreme, natural dynamics and the human influence.
- We should pay more attention to stakeholder analysis.
- What are the most important drivers behind changes in land use?
- How can we translate case study results to lessons for other regions?
- How does the balance of power influence land use?
- How much biodiversity do we really need?
- We need more knowledge about strengthening the relationship between biodiversity and economic development by eco-efficiency. On what scale does this occur?
- How to judge the eco-efficiency of agro parks, organic farming, separation or integration of functions?
- We need more knowledge about the relationship between biodiversity and non-western cultures.
- Local knowledge can be helpful when too little data are available.
- Experience from the Netherlands and Europe can be helpful in using local knowledge to get things started.
- More insight is needed into local processes of governance.
- We should pay more attention to a participatory approach.



# Poster Theme 3: Biodiversity, land and water use

Eric Arets, Irina Bezlepkina, Rob Jongman, David Kleijn, Peter v.d. Meer, Cora van Oosten and Bas Pedrolí

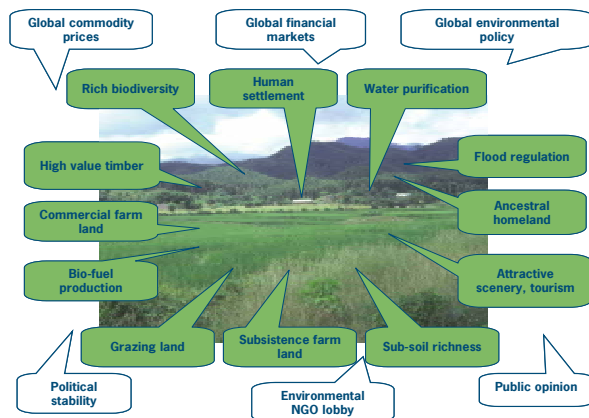


## Competition for natural resources

- The growing world population and the increasing prosperity stimulate the demand for food, energy and commodities.
- This will lead to increasing competition for land for food production, biofuels and other important ecosystem services.
- Drawbacks are soil degradation, water shortage and loss of biodiversity.

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## What decides local types of land use?



## Research at Wageningen UR on biodiversity in relation to land use and sustainable development

- Research from various ecological, economical, social and political points of view.
- Multidisciplinary approach.
- Mix of case studies and modeling.
- Involvement of stakeholders.

## Land Use Functions (LUPIS project)



## Some conclusions

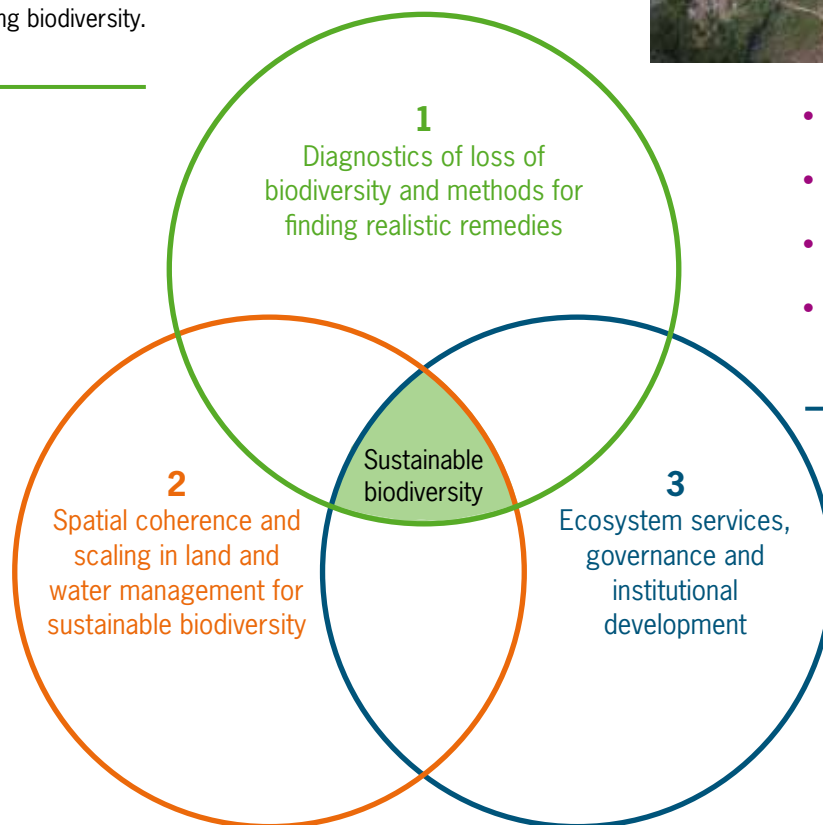
- Biodiversity should be an integral part of strategies for sustainable development.
- Our conclusions underline the importance of interconnecting research at different scale levels.
- Studies on effects of changing land use on biodiversity are not always well-founded.
- The institutional context is important, but often hard to deal with.
- Data on both biodiversity and land use are limited.

# Poster Theme 3: Biodiversity, land and water use - Knowledge issues

Eric Arets, Irina Bezlepkina, Rob Jongman, David Kleijn, Peter v.d. Meer, Cora van Oosten and Bas Pedrolí

## Priorities for a research agenda for KB1

- Relations between land use, climate change, biodiversity and monitoring issues.
- Measures for conserving biodiversity.
- Remote sensing.



- Institutional and socio-economic context.
- Biodiversity in relation to sustainable means of living.
- Innovative financing mechanisms.
- Effective communication via platforms and roundtable conferences.

- Biodiversity indicators.
- To include natural dynamics.
- Sustainable ecological networks.



# Theme 4: Agriculture and water in urbanized delta

*Bart Makaske, Peter Smeets and Henk Wolfert (Alterra).*



Many of the world's large deltas are densely populated. They have known a long history of occupation, due to their fertile soils and good connections with the hinterland and overseas territories. Deltas provide rich, but vulnerable living conditions. Worldwide, deltas are under pressure due to the problems of climate change, the rapidly expanding world population and consequent economic development.

After recent disasters in the deltas of New Orleans and Burma, there is a call for sustainable strategies for protecting living conditions in the deltas. Urgent issues are soil subsidence and sea level rising, coastal erosion, salinization, soil and water pollution, river dynamics, floods caused by high seas and rivers.

Important causes are disturbance of natural dynamics in the deltas and interruption of the water and sediment streams that used to be important for a healthy balance between sedimentation and erosion in the deltas.

So far, short term technological solutions are dominant, in spite of undesirable side effects and limited usefulness. In the search for sustainable solutions all stakeholders should be involved.

Key question is whether Wageningen will be able to develop alternative strategies for combining the natural dynamics and ecological functioning with sustainable agriculture and safe living in the deltas.

Agroparks, clustering various agricultural and non-agricultural chains, can be a very suitable solution. Industrial ecology is important here. Agroparks contribute to sustainable development via low costs, high environmental efficiency and good working and living conditions for humans and animals. They are highly productive and space-saving. In densely populated deltas, you'll find a great consumer demand and a good infrastructure. However, space and natural resources have to be managed economically. For such system innovations, a close collaboration between knowledge institutes, authorities, public organizations and the business world will be crucial. At present, Alterra is researching into agropark projects in the Netherlands, India and China.

## Theme 4, from the discussion:

- Where's the dividing line between 'rural' and 'urban'?
- Urgency of various problems and need for interventions.
- Is there a real problem or are we just discussing the proper distribution?
- Many developing countries lack the data and means for the Wageningen UR approach.
- Ecology needs attention and can support safety.
- Delta and agroparks are a good combination.
- How to organize agroparks in deltas?
- How to produce enough meat for 16 million people?
- The Netherlands: a model country.
- Agroparks need a strategy and an agenda. The goal is policy innovation with a long term view; knowledge is a by-product from this process.

# Poster Theme 4: Agriculture and water in urbanized deltas

Bart Makaske, Henk Wolfert and Peter Smeets

## Deltas: a vulnerable physical environment

The large deltas in the world are a rich, but vulnerable living environment. Worldwide, deltas are under pressure due to climate change, the rapidly expanding world population and consequent economic development.

Seven issues are urgent:

- Soil subsidence and sea level rising;
- Coastal erosion;
- Salinization;
- Soil and water pollution;
- River dynamics;
- Flooding caused by high seas;
- Flooding caused by rivers.



Various types of management can contribute to livable deltas:

- Technological management – artificially raising vital parts of the delta and erecting hard-surfaced coastal defences and river dykes;
- Half-natural management – purposeful use of constituent processes in the natural delta dynamics, in combination with technological measures;
- Natural management – giving way to natural delta dynamics.

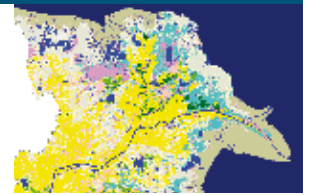
## The Yellow River delta: project successful, but goal missed

**Problem:** Water shortage threatens biodiversity in an important stepping stone of the East Asian Flyway for migratory birds.

**Approach:** An extensive, well-built model armamentarium has been realised for analysing various scenarios.



Red-Crowned Crane.



Yellow River Delta.

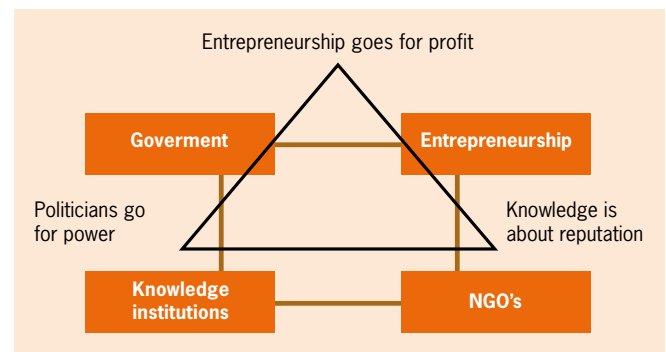
**Stumbling block:** The broad, previously agreed assembly for building realistic scenarios together never materialized, due to competing claims and governance issues.

**Result:** Bureaucracy, administrative compartmentalization and established interests made sure that the resulting tool will never serve its proper purpose and may even be misused.

## Metropolitan agriculture in deltas

An agropark is a system innovation in agricultural production, processing and logistics. By spatial clustering of various agribusiness and non-agribusiness chains, and by means of industrial ecology, agribusiness parks contribute to sustainable development, thanks to low costs, high environmental efficiency and good working and living conditions for both humans and animals. Collaboration between knowledge institutions, government, non-governmental organisations and entrepreneurship is of vital importance for this system innovation (KENG I).

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# Poster Theme 4: Agriculture and water in urbanized deltas - knowledge issues

Bart Makaske, Henk Wolfert and Peter Smeets

How can Wageningen develop strategies for multifunctional use of the deltas, combining natural delta dynamics and ecological functioning with sustainable agriculture and safe living? Which knowledge do we need for developing such strategies? To what extent are different deltas calling for different strategies?

## Agriculture

- How to keep farming in drowning deltas?
- What prospects do agroparks offer for sustainable spatial planning and development of densely populated deltas in poor countries?
- How can we design a *third space*, where our explicit knowledge in the shape of scientific inventions, combined with the *tacit knowledge* of authorities and entrepreneurs can result in innovations?

## Water management and safety issues

- Are the Dutch solutions for water management suitable worldwide?
- How to deal with water management and safety at the administrative level?
- How to deal with salinization?
- What's the best way to attribute scarce water supplies to various functions?

## Ecology

- What will happen to nature in urbanizing deltas?
- How can nature and safety be combined in deltas?
- Is (restoration of) natural delta dynamics feasible and desirable?

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# Forum discussion with input from the audience

## What are the real knowledge issues?

### In the forum panel

Wouter Lincklaen Arriens (ADB, Lead Water Resources)

Niels Louwaars (Cluster leader BO International Cooperation)

Pieter Vaandrager (Staff officer, ministry of LNV)

Chris de Visser (Coordinator of KB programme Sustainable Agriculture)

Pier Vellinga (Coordinator of KB programme Climate change)

Krijn Poppe (Coordinator of KB programme Transition processes, institutions, governance and policy making)



*Discussion chaired by Eelke Wielinga (LEI).*

What should be on the research agenda for 2010 and beyond? That is the lead question for today's discussion, chaired by LEI-researcher Eelke Wielinga. First of all, he invites the panel members to comment on the importance of the various research themes and to bring up suggestions for research into these themes. Are the research themes sufficiently scientific? Do they fit in with the Knowledge Base programme? And to what extent are we dealing with characteristic "Wageningen" themes?

### What did the panel members notice most today?

Pieter Vaandrager states that knowledge can only be meaningful if it is useful. He refers to a recent presentation of a research project from China, which had raised the question: "Would the Chinese people use our results somehow?" The answer was: "We don't think so." Wouter Lincklaen Arriens advocates a serial and a radial way of scientific thinking. He is happy about today's focus on the importance of local knowledge. "Asia knows huge geographic and cultural differences and a huge diversity among the countless subregions." Niels Louwaars thinks how to deal with this tremendous diversity is a knowledge question in itself. "Just think of the great differences in physical environment or governance styles. International comparisons can lead to very valuable knowledge and new strategic values", says Louwaars. Chair Wielinga notes that at this conference, a great deal of attention has been paid to processes, such as administrative processes and research processes. "We had quite a lot of monodisciplinary topics and only a few interdisciplinary or transdisciplinary topics on the agenda." Chris de Visser reminds

his audience of the big social themes from the morning programme, such as how to fit food security and water safety into the landscape. "In the afternoon, such big questions were less noticeable." De Visser does appreciate the generous attention to gamma knowledge. "After all, that's crucial if we are to be really effective." Krijn Poppe noticed various big and hence very relevant themes popping up. "But one does not answer such big questions in a single project. At this congress, the world problems have been considered as an organizational challenge rather than a technological issue. "But please remember that deltas have been formed by hundreds, if not thousands of years of 'micro behaviour'. In order to understand such micro behaviour, more research will be necessary. "What exactly does a delta inhabitant do? A Chinese farmer may spend half his life working as a coal miner. The land owner may live thousands of kilometers away." Besides, Poppe calls for attention to feed-back mechanisms towards policy makers. "Reports that remain unread are no use." Pier Vellinga wonders whether the point of view of 'competing claims' does not overemphasize the idea that land could be used in one way only. "At the World Bank, the slogan for biodiversity protection is *Use it or loose it*. We have to take up the ambitions of people who think of clever administrative solutions for combining food security and sustainable use of

biodiversity. Water and energy resources should be combined with nature protection. All these ambitions call for clever institutional and technological management. I would like to see an operational rather than a merely diagnostic approach. It seems to me that catchwords like 'sustainable use' en 'social security' are more relevant than 'competing claims'." Vaandrager joins in with the remark that agroparks, such as pig flats, which often call up massive public resistance, will never be realized as long as the focus remains on possibilities to mitigate the disadvantages, rather than underlining the big advantages, too.

*Wouter Lincklaen Arriens: "One science does not fit all."*

**Now what's the big challenge for future research?**

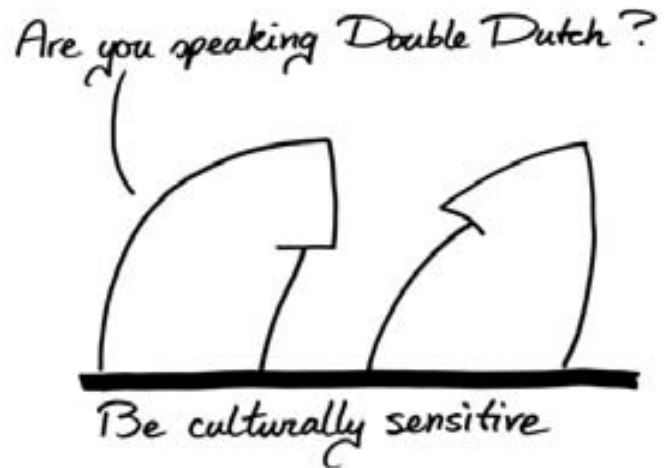
Vaandrager thinks it's a major challenge to make sure that technological innovation is accepted by the business world, NGOs and elsewhere. Lincklaen Arriens would like to see 'Wageningen' concentrate on issues that the Netherlands are really good at, such as dealing with land and water. "Besides, it is important to design country dependent models, and have Dutch researchers define the investigation boundaries at meta-level, while local researchers fill in the details. *One science*





doesn't fit all." Louwaars sees possibilities for joining various Wageningen research programmes together and make them operational, working together with local partners. "Today, many interesting start-ups and much operational gamma knowledge have been presented. I see no strategic knowledge questions here."

Poppe confirms that the international community, when thinking about Holland, does indeed think mostly of deltas, water, food and possibly safety and justice, too. "This is where Holland can really make a difference! The hub system of the ADB appeals to me. Anyway, at a methodological level, Wageningen has more feeling for beta than gamma questions. Besides, the Dutch do like consensus and they are fairly insensitive to hierarchy. I'm sure we can do good gamma research abroad, but one does have to be culturally sensitive."





## How relevant are the following research questions?

### *Land use and climate change*

How will climate change influence migration patterns? Vaandrager says we are in a time fix. Poppe thinks that REDD is not only based on differences in prosperity, but also on differences in scarcity.

*Leo Stroosnijder: "The absorption capacity of many developing countries for taking up knowledge is very limited."*

Leo Stroosnijder, having done transdisciplinary research for about 20 years in developing countries mostly, cannot but conclude that by doing so, a huge reservoir of knowledge can be gathered indeed. "However, I found the absorption capacity of many developing countries for taking up all this knowledge and putting it to good use very limited, in spite of many efforts at capacity building, in cooperation with NUFFIC. So we should not stop at formulating new research questions, but we should also make sure that this knowledge will be put to good use." Wielinga is more optimistic. "Now, let's take a look at Benin. After 15 years of capacity building together with Wageningen UR, Benin itself is now turning out good PhD students."

### *Land degradation and desertification*

The issue of salinization needs more serious attention. Desertification is a lead theme in Dutch research. De Visser notes that nowadays, Sahel countries such as Niger are turning greener. "How can that be and how could that approach be exported to neighbouring countries?" Lincklaen Arriens is interested in the question of how flows of funds are linked to research. He observes a tremendous demand for knowledge and a great deal of money involved. "ADB clients and partners are greatly interested in knowledge, though their questions may be more practical. Anyway, practical questions can lead to more fundamental questions as well." Lincklaen Arriens sees good opportunities for collaboration with local ADB knowledge centres. Louwaars thinks the lack of absorption capacity in many developing countries is a developmental problem rather than a knowledge problem. "The aim of the KB programme should be using individual cases for extracting more generic knowledge at a higher level, which can be valuable for new cases too. Knowledge and insight must be at the core of the KB programme."



Vellinga is an advocate of 'out of the box thinking'. "If food prices are going up by 50 percent, what would that mean for rural development? WUR should tackle such issues. Sometimes, land degradation is caused by bad food prices."

*Pier Vellinga: "We should think out of the box."*

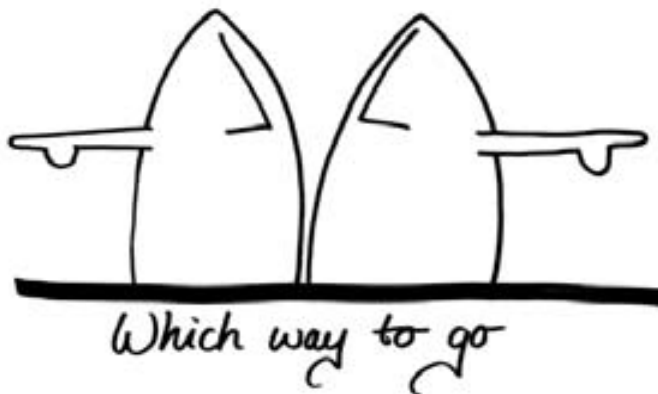
#### *Biodiversity and land and water use*

De Visser thinks that an important question is how to make more clever use of biodiversity, in combination with other functions and how to make more sensible use of natural resources anyway. Lincklaen Arriens thinks the functioning of ecosystems is a tremendously important question. "Asia is developing rapidly and there is a huge loss of plant and animal species loss. We need a solid scientific foundation to explain to the public what it really means when species are lost forever."

*Peter Smeets: "In transdisciplinary research knowledge is a byproduct."*

#### *Agriculture and water in urbanizing deltas*

With increasing prosperity, the Chinese would need all the arable land in the world for themselves. Intensification of agricultural production is an urgent issue. This theme appeals to De Visser. Louwaars would like to see more research into the question of what is really eco-efficient. Peter Smeets states that knowledge is not a purpose in itself, but a byproduct of transdisciplinary research. "The final goal is policy innovation, for instance at the ministry of LNV." Vellinga thinks the idea of knowledge as a byproduct is a bit over the edge for a knowledge institution. De Visser agrees, stating that knowledge development can be a goal in itself as well. Poppe would like to share another knowledge issue: How to restore the Krammer Volkerak, now an ecological disaster area, in our own delta? That leads to the bigger question of how to make Holland beautiful once again.



# Henk de Jong

Deputy Director of International Affairs at the Ministry of Agriculture, Nature and Food Quality, LNV

“Working at solutions.”



“The KB congress and in particular the lecture on transdisciplinary research confirm my point of view that in the future, political willingness and implementation will bear an even greater significance than technical solutions. In practise, transdisciplinary research has long proved its value. Scientists don't have to carry the load themselves: in countries like Ethiopia all shareholders are joining in. If local authorities and, possibly, agricultural councils are participating as ‘matchmakers’, this will make a valuable bottom-up contribution to political willingness. Financers should join in the implementation as well. The approach to transdisciplinary research is already quite practicable in spite of some remaining methodological questions. Besides, a lot can be learnt by comparison between countries. For instance, Vietnam is a country that is quick to pick up all sorts of scientific conclusions, whereas Indonesia seems to remain stuck in institutional discussions. I think it is very important to work towards solutions and to research the question what is necessary for the implementation of solutions. Here, quite a few knowledge questions are remaining. Let's pick up those research issues that the Netherlands are really good at. For instance, we are good at system thinking. Let's make better use of local knowledge. And let's work together more with other excellent research groups rather than try to do everything ourselves.”

## Reaction by Paul Opdam

First of all, this congress has shown that at least the Knowledge Base programmes KB1 and KB4, KB7 and KB10 ought to join hands when building their research programmes. Close collaboration will be crucial for international Knowledge Base research into competing claims. In developing countries, the spatial development of the green and blue space is always closely connected to the primary sources of living, including food production. The quality of the living environment can be found at a higher level in Maslow's hierarchy of needs. That's

why it is impossible to keep food and fibre production issues away from the spatial debate, although that is exactly what we have been trying to do in the current KB programme. From now on, we've got to join forces across the boundaries of our present KB research themes. If we are to link relevant projects on various themes, we need to have a larger say in sharing out the efforts and financial means of the separate institutions that are to collaborate. This issue is presently being discussed at the Wageningen UR.



A second conclusion today is that neither technical solutions nor governance, but only the coupling of both can provide the best base for “science for impact”. This is a universal principle. As stated by Wouter Linklaen Arriens of the Asian Development Bank, *governance of physical systems* is a key concept. This concept has to be integrated into our way of system thinking – which is unanimously recognised as a strong point of the Wageningen UR. Spatial systems can be regarded as *Social-Physical Systems*: i.e. systems where physical and social components are interacting and interreacting. In scientific literature, this is an emerging, though early concept. You’ll recognize the same ideas in the IPOP spearheads *scaling and governance*. In the new theme description of KB1, the concept of Socio-Ecological systems has been chosen as a starting point. This concept would make a good conceptual starting point for the KB 7 programme, too. Hence, the Knowledge Base research programme would become even more coherent.

The congress has also shown that separate spearheads or themes for international research are undesirable indeed. The international dimension will enrich KB1 and it is a scientific necessity as well. The problems we are studying are comparable worldwide. Generic aspects of knowledge development are relevant both for the Netherlands, Europe and elsewhere. Jetse Stoorvogel demonstrated his model predictions for Kenyan farmers switching to ecosystem services. His conclusions would be perfectly applicable in the Dutch Achterhoek as well, only as far as I know, it hasn’t popped into anybody’s mind yet.

My “aha experience” today was that from a scientific point of view, it can be greatly rewarding to compare cases in the Netherlands, Europe and elsewhere. This will teach us more about the question under which cultural, political and other circumstances our knowledge and methods may or may not be relevant, legitimate and effective. Therefore, within the framework of KB 1, international projects will be necessary in order to keep researchers from taking a too narrow view on the impact of their science. This will make interesting material for scientific publications with a lot of international impact, material which I am going to explore and harvest.

For KB1 this will mean building up and analyzing a series of cases. However, all of these cases will have to be placed in the same scientific framework. Suitable bridging concepts are sustainable spatial development, socio-ecological systems, synergy between local and generic knowledge.

Today, we’ve seen the great importance of combining local knowledge and insights with generic scientific knowledge. Are we thoroughly aware of this insight in our KB1-programme now? The transdisciplinary approach is an important scientific method on behalf of ‘science for impact’. The methodology needs to be developed further.

Finally, an important conclusion is that researchers tend to make their models forever better, more complete, more complex and hence less usable. Useful models are simple and offer the possibility to feed them with local knowledge and insights. Altogether, it has been a most illuminating congress!



## Colofon

Publisher: Alterra, Wageningen University, Environmental Sciences  
Visiting address: Droevendaalsesteeg 3, 6708 PB Wageningen, Building 100 + 101  
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[www.wur.nl](http://www.wur.nl)

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Logistics: *Marion Bogers, Erica Hiddes, Cees Niemeijer and Inge Koning, Alterra, Wageningen UR*

Text and translation: *Marion de Boo, science writer, Bleiswijk*

Cartoons: *Esther Mosselman, Zwaar Water creative productions, Amsterdam*

Final editing: *Bert Harms and Anne Oosterbaan, Alterra, Wageningen UR*

Pictures: *Alterra, Wageningen UR en Jannes Stolte*

Design: *Communication Services, Wageningen UR*

Print: *Digigrafi, Wageningen*

Printing: 200

Extra booklets can be ordered via: [erica.hiddes@wur.nl](mailto:erica.hiddes@wur.nl)

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