Preface

Introduction

In 2000, the Executive Board of Wageningen University established an Interdisciplinary Research and Education Fund (INREF) as a university-wide framework for development-oriented research. The decision ensued from an evaluation of an earlier university-wide project in the 1980s–1990s as well as a reflection on the university's role in a changing world. The initiative came on top of many development-related activities Wageningen researchers were already engaged in. It was meant as a joint corporate framework that should have more impact than the sum of separate, individual activities. Most existing projects of Wageningen researchers, even when undertaken as part of international networks, involved little contact with colleagues from other disciplines. INREF, on the contrary, supported broad interdisciplinary programmes in which Wageningen researchers worked together both with colleagues from other disciplines within Wageningen University and with partner institutes, especially from the South.

Six interdisciplinary programmes have been carried out in the period 2000–2005. Their objectives ranged from concrete aims like combating micronutrient malnutrition or improving the use of fish ponds in small mixed farms to methodological ones like the improving of processes of participatory technology innovation or the identification of pathways for development in less-favoured areas.

This special issue presents some first experiences with and lessons learned from these programmes. The papers included in this issue explain the assumptions and choices from which they started, and some present first results and insights that follow from them. In this preface, we sketch the motives that inspired the INREF initiative, introduce the programmes and the papers thereon.

Agronomy and development: changing perspectives

Wageningen University has defined its mission as contributing to *the quality of life with pioneering research and innovative teaching programmes in the areas of nutrition and health, sustainable agrosystems, a viable environment and processes of social change*. Like agricultural universities elsewhere, Wageningen was a product of the separation of agricultural science from practical farming in the late 19th century, and went through a far-reaching process of disciplinary specialization. The feedback to practice was long pursued by a hierarchical model of government-sponsored research, extension and education. This was also embraced in the tropical division of the university, which evolved from a school for colonial agronomists into an agronomic support centre of the state-centred international development approach that dominated in the 1950s–1970s. Other agronomic centres applied the same model at the time. On a world scale, the model played a

major role in the new productivity boom in western agriculture, while in the developing world its main achievement was the green revolution.

From the 1970s, however, criticism on this model of top-down transfer of technology increased. Successful agricultural development appeared to have important social and environmental drawbacks, but disciplinary specialization obscured the view on such side-effects. Moreover, social scientists like Sen (1981) highlighted the fact that poverty, not failing availability of food, was the major cause of hunger and malnutrition. Last but not least, in many areas (including almost all Sub-Saharan Africa) the green revolution model had little impact or no impact at all.

The response of agronomic scientists was a quest for interdisciplinarity and systems approaches. In Wageningen, the 'production ecology' school of C.T. De Wit and his followers pioneered a more integrated agronomic approach. Also, many Wageningen researchers joined the 'farming systems' approach that was being introduced by Ruthenberg (1980) and others. It was in this context that Wageningen University, in the early 1980s, initiated a *Satellite Programme* for development co-operation under which it established branch-establishments in Costa Rica and Burkina Faso. It involved a substantial investment for the university, and reflected a feeling that development research needed an interdisciplinary approach and a local setting for being effective. Staff members of different disciplines, employed by the university, were stationed at both centres to initiate interdisciplinary development research. The centres were independent, also financially, and made some contacts with local universities and research institutes. However, the core activity remained the on-the-spot training of Dutch undergraduates, and later, PhD students. The final reports of the Satellite Programme (Bouman *et al.*, 2000; Stroosnijder & Van Rheenen, 2001) concluded that the centres had generally achieved their initial objectives, but some shortcomings were also noted. After a slow and painful start, interdisciplinary research had indeed materialized. However, it involved a limited number of disciplines and the participation of local scientists and local students was limited.

New challenges

Meanwhile, the international context underwent far-reaching changes. Supportive farm policies in Asia, unequal tenure relations in Latin America, and 'urban bias' in Africa, set these regions onto entirely different pathways. In Asia, green revolutions paved the way for successful industrialization even though many 'less-favoured' areas were passed over. In Latin America, modernization of larger farms involved a mass eviction of small peasants, forced urbanization and unbalanced growth. In Africa, the exploitation of farmers to pay the expenses of growing 'development' bureaucracies entailed rural crisis, industrial stagnation and widespread disruption. While these differences destroyed the image of a homogeneous 'third world', global economic and political upheavals also affected the international development thinking. State-centred approaches began to give way to models that focused on private initiative. On the one hand, farmer field schools and other participatory models substituted a bottom-up approach for top-down models of extension. On the other hand, structural adjustment

and poverty reduction strategy papers introduced liberal policy reforms in developing countries. In international trade, the pursuit of managed trade by commodity agreements gave way to a campaign for trade 'liberalization'. The liberal-economic dynamic strengthened when from two superpowers only one remained. The balance began to shift from UNCTAD to the GATT/WTO, from FAO to the World Bank, from 'food security' to 'poverty reduction'. Both the liberal-economic 'Washington consensus' and the emerging counter-globalist criticism on it increased the attention to international causes of poverty and under-development. New global problems like climate change, decrease in biodiversity, and the HIV/AIDS epidemic, had similar effects.

The role of scientific knowledge in society also changed. Information technology provided a new scene in which modern research had to find its way, even in developing countries. Researchers increasingly participated in interactive processes that involved citizens, policy makers, industrialists, non-governmental organizations and other 'stakeholders'. Rather than to provide clear-cut answers to specific questions asked by separate parties, the role of researchers became to assist joint learning processes in which they took part. The challenge became both to mobilize different forms of existing knowledge and generate new knowledge where needed. Moreover, Wageningen researchers were faced with the fact that, unlike some decades before, many developing countries had built their own capacities for agronomic research. It forced Wageningen, as a knowledge centre in a developed country, to reconsider its role in development-oriented research. Besides, the continuing problems in some regions made that the effectiveness of scientific knowledge became an issue. Researchers could not go on making innovations for farmers who could not use them because enabling conditions were lacking, or building models to inform policy makers who were not capable or even willing to use them.

Wageningen University's Interdisciplinary Research and Education Fund

These various developments influenced the academic opinion in Wageningen. The experience of the Satellite Programme indicated that a new initiative should have more impact in the countries concerned. The rise of southern universities and the changing role of science made Wageningen scientists look for co-operation with southern partners and stakeholders. The new international developments made it clear that a more holistic interdisciplinary approach was needed to tackle the world's pressing problems. Simply studying agriculture, nutrition or food technology without considering the broader context seemed increasingly futile.

When the Executive Board of Wageningen University launched the new INREF fund, therefore, it decided that programmes financed by it should meet a number of requirements. In particular, such programmes should:

1. Embrace a systems approach combining all disciplines that were needed to tackle the sustainability and development problems at which they were aimed.
2. Involve activities in several regions of the world to allow comparison of major differences in conditions that affected development.

3. Co-operate with institutes in the countries concerned, right from the start when defining joint projects, also with a view to local capacity building.
4. Involve joint PhD projects of the 'sandwich' type (six months in Wageningen, three years in developing country, six months in Wageningen) to focus research on issues of local interest, while providing a timeframe for the work.
5. Pay adequate attention to practical applicability and relevance of results obtained.

With respect to interdisciplinarity, especially the co-operation between beta- and gamma-disciplines was emphasized. There were high hopes that collaboration of technical and social scientists could help to tackle problems that these scientists separately could not solve.

This, then, was the challenge that the INREF project had set for itself. The six research programmes that followed took up this challenge, and the problems they addressed were rooted in the above discussions.

Contents of this issue

The papers below come from these six programmes.

1. The first paper describes the programme *From natural resources to healthy people*. This addresses the micronutrient malnutrition that causes massive health and economic problems in developing countries. Current approaches for combating this malnutrition (dietary diversification, supplementation and fortification) often have modest results. An idea that has recently become fashionable is the breeding of staple crops with increased contents of bio-available micronutrients (biofortification), but whether this will be more effective remains to be seen. This programme seeks to develop an alternative answer by letting soil scientists, agronomists, food technologists and nutritionists (from Wageningen and partner institutes in West Africa and China) develop an integrated seeds-to-meals approach for improving the intake of bio-available nutrients.
2. The second paper comes from the *Programme for Optimisation of Nutrient Dynamics and Animals for Integrated Farming* (POND). Livestock and fish specialists, breeders and soil scientists from Wageningen, Can Tho University (Vietnam) and the World Fish Centre in Abbassa (Egypt) try to enhance the ecological and economic sustainability of small crop–fish–livestock farms by improving the fish pond management and breeding fish varieties that perform well under low-input conditions. Crop–fish–livestock systems are currently concentrated in South-East Asia, but one might think about their potential usefulness for redressing soil degradation in Sub-Saharan Africa. The paper describes one output of the programme: a fuzzy model that tries to understand farmer decisions on fish ponds, on the basis of data collected in participatory field research in Vietnam.
3. The third paper is based on the programme *Agro-Industrial Transformations toward Sustainability* (AGITS). Under the guidance of Wageningen social scientists and environmental technologists and social science institutes in Thailand, Malaysia, Vietnam, China and the US, PhD students try to integrate social science models and theories, among which network analysis, and environmental analysis of material

flows and technologies for reducing the environmental burden of agro-industrial systems in South-East and East Asia. The paper surveys the history of natural science and social science analyses of environmental flows, and illustrates the integrated approach through a case study of a Vietnamese village that is specialized in small-scale production of cassava starch.

4. The fourth paper comes from the programme *Regional Food Security Policies for Natural Resource Management and Sustainable Economies* (RESPONSE). This is a joint programme of Wageningen University and the International Food Policy Research Institute in Washington, where agronomists and social scientists co-operate to identify pathways for sustainable intensification in less-favoured areas. The leading idea is that physical and social heterogeneity between and within less-favoured areas leads to more complex interaction of biophysical and socio-economic forces. This makes much better targeted policies necessary for sustainable development. The inspiration for the RESPONSE programme comes from a tradition of bio-economic modelling within a standard equilibrium framework. The paper presents an example of this modelling that helps to identify research questions and to define appropriate fieldwork methods in this approach.

These papers, which focus on the content matter of the programme research, make up the first part of this issue. The papers in the second part focus on the process of management of the programmes themselves.

5. The fifth paper analyses the life history of the programme *Convergence of Sciences* (CoS). This aims at improving multi-stakeholder based technology innovation processes for better integrated crop and soil management. The research focuses on the management of agricultural research for small farmers in Ghana and Benin. Coming from a background of participatory collaboration with farmers, the agronomists and social scientists involved try to transcend the current situation where there are many participatory methods that do not bridge the cleft between local and scientific knowledge. Their objective is a more synergic approach in which local farmer knowledge, agronomic expert knowledge and social sciences are combined for increasing the effectiveness of small-scale agriculture in developing countries. The programme is a joint activity of Wageningen University, universities in the two countries, and the FAO IPM Facility. Diagnostic studies of concrete crops and constraints have been published in another special issue of this journal (Hounkonnou *et al.*, 2004). The paper in this issue reviews the evolution of the programme to draw lessons about the management of this kind of participatory and trans-disciplinary research programmes.
6. The sixth paper analyses the history of a much more high-tech oriented programme. This programme, *From vegetable production to healthy food*, is a joint PhD programme for vegetable genomics of Wageningen University and the Chinese Academy of Agricultural Sciences. Thirteen Chinese sandwich PhD students work on resistance to pests and diseases, the development of genetic material and bioinformatics tools, and the biofortification of crops with micronutrients and health-promoting metabolites. The last theme involves plant breeders and nutrition scientists, and can be seen as a counterpart of the approach adopted in *From national resources to healthy people* (see first paper of this issue). The programme is funded by the Dutch and the

Chinese partner on a fifty–fifty basis, and includes the establishment of a modern genomics laboratory in China. The paper focuses on the organizational complexities of running a joint programme with academic partners from different cultural backgrounds and educational cultures.

In a concluding paper, the guest editors use the experiences of the programmes for some more general conclusions. They indicate strong points of the INREF approach, but they also reflect on limitations. Some critical self-reflection is important to inspire next steps in the struggle of the 'life sciences' to come to grips with their own problems and the changing requirements of the world. This is the more relevant now that the success of the INREF initiative has made the Executive Board of Wageningen University decide for a second phase in 2005–2008.

References

Bouman, B.A.M., H.G.P. Jansen, R.A. Schipper, H. Hengsdijk & A. Nieuwenhuyse (Eds), 2000. Tools for Land Use Analysis on Different Scales. With case studies for Costa Rica. Systems Approaches for Sustainable Agricultural Development. Kluwer Academic Publishers, Dordrecht, 274 pp.

Hounkonnou, D., S.K. Offei, N.G. Röling, R. Tossou, A. Van Huis, P.C. Struik & J.F. Wienk (Eds), 2004. Diagnostic Studies: a Research Phase in the Convergence of Science Programme. Special issue *NJAS – Wageningen Journal of Life Sciences* 52(3/4): 209–448.

Ruthenberg, H., 1980. Farming Systems in the Tropics. Clarendon, Oxford, 424 pp.

Sen, A., 1981. Poverty and Famines: an Essay on Entitlement and Deprivation. Clarendon, Oxford, 257 pp.

Stroosnijder, L. & T. Van Rheenen (Eds), 2001. Agro-silvo-pastoral land use in Sahelian villages. Advances in Geoecology 33. Catena, Reiskirchen, 408 pp.

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