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	A methodology for integrated economic and environmental analysis of pollution from agriculture/ Arild Vatn, Lars Bakken, Marina A. Bleken, Ole Hans Baadshaug, Haldor Fykse, Lars E. Haugen, Helge Lundekvam, John Morken, Eirik Romstad, Per Kristian Rorstad, Arne O. Skjelvag, Trine Sogn Agricultural Systems, Volume 88, Issues 2-3, June 2006, Pages 270-293, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.04.002. (http://www.sciencedirect.com/science/article/B6T3W-4GK1GSS-1/2/44c323ccb625872c1a5d1fe88142ffd1) **Abstract:** This paper presents a methodology for analyzing the effect of policies focused at reducing pollution from agriculture. Such a methodology must take into account that agricultural pollution is an effect of a large set of interacting processes, covers many different substances, and may vary substantially due to shifts in natural and economic conditions. Thus, the methodology must both cover the specificities of the different processes/disciplines involved and foster integration across these in a consistent way. The basic challenge is to cover the non-linear fine-scale variations at different levels of land-based production systems. Our methodology is founded on the idea of partitioning. It implies structuring and simplifying existing variation in space and time into partitions that are considered homogeneous. These partitions are organized in a hierarchy, and the different processes involved are modeled at the relevant level. We have concluded that analyses with fairly high level of resolution are preferable. This way it is also possible to combine a systems perspective with disciplinary integrity. A modeling structure - ECECMOD (2.0) - based on the developed principles is documented. The paper also shows the ability of this structure to simulate choice of farming practices and emissions that are well in accordance with observations from four Norwegian regions with very different agricultural and natural conditions. **Keywords: Pollution from agriculture; Nutrient emissions; Erosion; Pesticide use; Policy analyses; Partitioning; Interdisciplinary analyses**
	A qualitative multi-attribute model for economic and ecological assessment of genetically modified crops/ Marko Bohanec, Antoine Messean, Sara Scatasta, Frederique Angevin, Bryan Griffiths, Paul Henning Krogh, Martin Znidarsic, Saso Dzeroski. **Ecological Modelling, Volume 215, Issues 1-3, Selected Papers from the International Conference on Ecological Modelling, 28 August - 1 September 2006, Yamaguchi, Japan, 10 July 2008, Pages 247-261, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2008.02.016.** (http://www.sciencedirect.com/science/article/B6VBS-4S7X6MK-2/2/d6da287862e642e925a57fe6bd28e013)

	Abstract: Genetically modified (GM) crops have become a real option in modern agriculture. They offer advantages for agricultural production, but they also raise concerns about their ecological and economic impacts. Decisions about GM crops are complex and call for decision support. This paper presents a qualitative multi-attribute model for the assessment of ecological and economic impacts at a farm-level of GM and non-GM maize crops. The model is applied for one agricultural season. This is an ex-ante model developed according to DEX methodology. In this model, cropping systems are defined by four groups of features: (1) crop sub-type, (2) regional and farm-level context, (3) crop protection and crop management strategies, and (4) expected characteristics of the harvest. The impact assessment of cropping systems is based on four groups of ecological and two groups of economic indicators: biodiversity, soil biodiversity, water quality, greenhouse gasses, variable costs and production value. The evaluation of cropping systems is governed by expert-defined rules. The paper describes the structure and components of the model, and presents three practical applications of the model, assessing both hypothetical and real-life cropping systems. In an overall assessment of the ecological and economic outcomes the model ranked cropping systems in the order: organically managed > GM systems including Bt and HT traits > conventionally managed maize. The paper discusses contributions of the model to decision-making practice and highlights methodological lessons learned during its development. **Keywords: Decision support; Qualitative models; Multi-attribute models; Cropping systems; Genetically modified crops; Economy; Ecology**
	Andreas Guntner, Integrated modelling of climate, water, soil, agricultural and socio-economic processes: A general introduction of the methodology and some exemplary results from the semi-arid north-east of Brazil/ Maarten Krol, Annekathrin Jaeger, Axel Bronstert. **Journal of Hydrology, Volume 328, Issues 3-4, The ICWRER - Symposium in Dresden, Germany, 15 September 2006, Pages 417-431, ISSN 0022-1694, DOI: 10.1016/j.jhydrol.2005.12.021.** (http://www.sciencedirect.com/science/article/B6V6C-4JHMSYC-2/2/74479b0c2f83942c217a601f053c100f) Abstract: Summary Many semi-arid regions are characterised by water scarcity and vulnerability of natural resources, pronounced climatic variability and social stress. Integrated studies including climatology, hydrology, and socio-economic studies are required both for analysing the dynamic natural conditions and to assess possible strategies to make semi-arid regions less vulnerable to the present and changing climate. The model introduced here dynamically describes the relationships between climate forcing, water availability, agriculture and selected societal processes. The model has been tailored to simulate the rather complex situation in the semi-arid north-eastern Brazil in a quantitative manner including the sensitivity to external forcing, such as climate change.

	The selected results presented show the general functioning of the integrated model, with a primary focus on climate change impacts. It becomes evident that due to large differences in regional climate scenarios, it is still impossible to give quantitative values for the most probable development, e.g., to assign probabilities to the simulated results. However, it becomes clear that water is a very crucial factor, and that an efficient and ecologically sound water management is a key question for the further development of that semi-arid region. The simulation results show that, independent of the differences in climate change scenarios, rain-fed farming is more vulnerable to drought impacts compared to irrigated farming. However, the capacity of irrigation and other water infrastructure systems to enhance resilience in respect to climatic fluctuations is significantly constrained given a significant negative precipitation trend. **Keywords: Integrated modelling; Integrated river basin management; Water resources management; Semi-arid hydrology; Climate change**
	Common agricultural policy reform and its effects on sheep and goat market and rare breeds conservation/ G. Canali and Ecogene Consortium Small Ruminant Research, Volume 62, Issue 3, The future of sheep and goat production in Europe: prospects within the framework of new support regimes and market conditions, April 2006, Pages 207-213, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.08.021. (http://www.sciencedirect.com/science/article/B6TC5-4HC6KXK-4/2/9f204feec404d4b882c51ac3915523bc) Abstract: In June 2003, the EU approved a very important reform of the CAP that will strongly affect the entire European agriculture. This paper analyses the major issues related to the effects of the evolution of the Common Agricultural Policy on the sheep and goat sectors, and especially the possible direct and indirect effects of the last reform in terms of accelerating or decelerating the loss of biodiversity due to the extinction of breeds. In fact, the single farm payment, fully or partly decoupled from any production, will include from 50% to 100% of the present amount of aid paid to sheep and goat breeders, according to decisions to be taken by each Member State. These decisions could deeply affect breeders' economic interests in continuing to breed sheep and goats or not. On the other hand, new regulations will also allow Member States to introduce supplementary premium in case of transhumance, and/or for preserving rare breeds, and/or for promoting high-quality food products which could be obtained from these breeds. These policy tools, together with the increased amount of money available for rural development could balance, at least theoretically, negative effects due to the application of decoupled aid. On the other hand, previous experiences show that these tools have not been used with efficacy in order to preserve endangered breeds. Therefore, new attention and new procedure are suggested in order to overcome these limitation and to improve in

	situ preservation of rare breeds. **Keywords: Conservation; Biodiversity loss; Common Agricultural Policy; Sheep breeds; Goat breeds**
1.	**Disaggregated greenhouse gas emission inventories from agriculture via a coupled economic-ecosystem model/ Henry Neufeldt, Michael Schafer, Elisabeth Angenendt, Changsheng Li, Martin Kaltschmitt, Jurgen Zeddies, Agriculture, Ecosystems & Environment, Volume 112, Issues 2-3, Mitigation of Greenhouse Gas Emissions from Livestock Production, February 2006, Pages 233-240, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.08.024.** **(http://www.sciencedirect.com/science/article/B6T3Y-4HMNFS1-1/2/9a1de99f1d47025b06a8c9aa1ca39bc5)** **Abstract:** Estimates of regional greenhouse gas emissions from agricultural systems are needed to evaluate possible mitigation strategies with respect to environmental effectiveness and economic feasibility. Therefore, in this study, we used the GIS-coupled economic-ecosystem model EFEM-DNDC to assess disaggregated regional greenhouse gas (GHG) emissions from typical livestock and crop production systems in the federal state of Baden-Wurttemberg, Southwest Germany. EFEM is an economic farm production model based on linear programming of typical agricultural production systems and simulates all relevant farm management processes and GHG emissions. DNDC is a process-oriented ecosystem model that describes the complete biogeochemical C and N cycle of agricultural soils, including all trace gases. Direct soil emissions were mainly related to N2O, whereas CH4 uptake had marginal influence (net soil C uptake or release was not considered). The simulated N2O emissions appeared to be highly correlated to N fertilizer application (R2 = 0.79). The emission factor for Baden-Wurttemberg was 0.97% of the applied N after excluding background emissions. Analysis of the production systems showed that total GHG emissions from crop based production systems were considerably lower (2.6-3.4 Mg CO2 eq ha-1) than from livestock based systems (5.2-5.3 Mg CO2 eq ha-1). Average production system GHG emissions for Baden-Wurttemberg were 4.5 Mg CO2 eq ha-1. Of the total 38% were derived from N2O (direct and indirect soil emissions, and manure storage), 40% were from CH4 (enteric fermentation and manure storage), and 22% were from CO2 (mainly fertilizer production, gasoline, heating, and additional feed). The stocking rate was highly correlated (R2 = 0.85) to the total production system GHG emissions and appears to be a useful indicator of regional emission levels. **Keywords: Greenhouse gas emissions; Coupled economic-ecosystem model; Agricultural production systems; Stocking rates**
	Economic impacts on cotton production due to land degradation in the Gediz Delta, Turkey/ E. Atis.

	Land Use Policy, Volume 23, Issue 2, April 2006, Pages 181-186, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2004.06.004. (http://www.sciencedirect.com/science/article/B6VB0-4DD9BPF-3/2/7c0bc494002e397704f40c58a4926ca9) Abstract: Soil salinity and waterlogging and other forms of land degradation reduce the agricultural productivity and farm income, while threatening the sustainability of agriculture in many areas. The purpose of the study is to estimate the economic impacts of land degradation on cotton production in the Gediz Delta, Turkey, where salinization and waterlogging threaten the sustainability of irrigated agriculture. Salinity and waterlogging have developed over time in the region, due to unfavorable use of irrigation water and inadequate drainage. We use data collected in a survey of farmers in the region to estimate regression models for cotton production on degraded and non-degraded soils. We conclude that cotton yields are reduced by 34.4% and gross margins are reduced by $860.2/ha, as a result of land degradation. **Keywords: Salinization; Waterlogging; Yield impacts**
	Economic transition and household food consumption: A study of Bulgaria from 1985 to 2002, Economics & Human Biology, Volume 4, Issue 3, December 2006, Pages 383-397, ISSN 1570-677X, DOI: 10.1016/j.ehb.2006.08.001. (http://www.sciencedirect.com/science/article/B73DX-4KXVD1R-1/2/ccac9915615aa8001e68c7430e08a7a8) **Abstract:** Major economic transitions typically entail changes in the availability of and purchasing power for different types of foods leading to long-term changes in the composition of the diet. Bulgaria, a former Eastern Bloc country, underwent a difficult and protracted transition from a centralized to market economy with acute economic crises and a much slower recovery of income levels than in Poland, the Czech Republic, and Hungary. Using annual data from the Bulgarian National Household Survey, we study changes in the reported consumption of major foods (excluding alcoholic drinks) and their constituent macronutrients from 1985 to 2002, examining also the differences in dietary patterns between the period prior to and following the transition. The consumption of most major food items decreased, resulting in a fall in per capita energy consumption of 429 kcal/day (1.80 MJ/d), following the economic transition of 1991. As expected, the consumption of foods that were more expensive per unit of energy decreased greater than cheaper foods, -34% for animal products and -19% for visible fats, but only -10% for carbohydrates. These changes are related to the changes in income and market prices as well as the general negative trend in economic growth and hyperinflation in the mid-1990s. Thus, Bulgaria experienced a decrease in food consumption without significant changes in the dietary pattern following the economic transition of 1991. The fact that part of this decline may

	be attributed to continued economic challenges suggests that future transitions in the diet may be expected as economic development proceeds. **Keywords: Economic transition; Diet; Agriculture; Food policy; Chronic diseases; Bulgaria; Food consumption; Nutrition**
	Economic transition and household food consumption: A study of Bulgaria from 1985 to 2002/ Ludmila Ivanova, Plamen Dimitrov, Dora Ovcharova, Jocilyn Dellava, Daniel J. Hoffman. **Economics & Human Biology, Volume 4, Issue 3, December 2006, Pages 383-397, ISSN 1570-677X, DOI: 10.1016/j.ehb.2006.08.001.** (http://www.sciencedirect.com/science/article/B73DX-4KXVD1R-1/2/ccac9915615aa8001e68c7430e08a7a8) Abstract: Major economic transitions typically entail changes in the availability of and purchasing power for different types of foods leading to long-term changes in the composition of the diet. Bulgaria, a former Eastern Bloc country, underwent a difficult and protracted transition from a centralized to market economy with acute economic crises and a much slower recovery of income levels than in Poland, the Czech Republic, and Hungary. Using annual data from the Bulgarian National Household Survey, we study changes in the reported consumption of major foods (excluding alcoholic drinks) and their constituent macronutrients from 1985 to 2002, examining also the differences in dietary patterns between the period prior to and following the transition. The consumption of most major food items decreased, resulting in a fall in per capita energy consumption of 429 kcal/day (1.80 MJ/d), following the economic transition of 1991. As expected, the consumption of foods that were more expensive per unit of energy decreased greater than cheaper foods, -34% for animal products and -19% for visible fats, but only -10% for carbohydrates. These changes are related to the changes in income and market prices as well as the general negative trend in economic growth and hyperinflation in the mid-1990s. Thus, Bulgaria experienced a decrease in food consumption without significant changes in the dietary pattern following the economic transition of 1991. The fact that part of this decline may be attributed to continued economic challenges suggests that future transitions in the diet may be expected as economic development proceeds. **Keywords: Economic transition; Diet; Agriculture; Food policy; Chronic diseases; Bulgaria; Food consumption; Nutrition**
	Economics of the impact of alternative rice cropping systems on subsistence farming: Whole-farm analysis in northern Ghana/ Emmanuel K. Yiridoe, Augustine S. Langyintuo, Wilson Dogbe. **Agricultural Systems, Volume 91, Issues 1-2, November 2006, Pages 102-121, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.02.006.** (http://www.sciencedirect.com/science/article/B6T3W-4JKYWM1-2/2/42187a2f5388dc544020a9a32651c902)

	Abstract: Reducing fallow periods with sown leguminous plants (i.e., Callopogonium mucunoides) was found to be a technically feasible, low-input method of improving soil nutrient levels for rice cropping in the Guinea and Sudan savannah regions of northern Ghana. However, farmers and policy makers are particularly interested in understanding whether the new rice production technology can be substituted for the traditional rice cropping systems within a whole-farm plan context and, if so, what are the likely resource allocation and financial implications to farmers. An optimal whole-farm plan that incorporates traditional (bush fallow) cropping of rice, jointly with livestock production was generated using a linear programming model, and then used to assess the economic implications of introducing the improved fallow (i.e., incorporating Callopogonium mucunoides) rice cropping system. The alternative combinations of enterprises investigated needed to be economically viable household farm units, as well as meet household food security requirements of such resource poor farmers. Introducing the new rice production technology into a base whole-farm model (i.e., under traditional rice cropping) increased rice area by 45%, and farm income above variable costs by 34%. In addition, the representative farm raises six beef cows and 72 poultry birds. In sensitivity analyses of alternative model scenarios, farm incomes were higher and more stable for farming systems using the new rice cropping technology than with the traditional whole-farm model. More widespread adoption of the new rice-based production technology will help transform existing traditional subsistence farming systems to more profitable commercial production systems. This transformation will have implications for farm structure (in terms of consolidation of highly fragmented holdings), agricultural resource management, and property rights (such as recognition of individualized rights to cropland, livestock grazing land and agricultural water resources). **Keywords: Rice; Whole-farm modeling; Subsistence agriculture; Ghana**
	New technologies, marketing strategies and public policy for traditional food crops: Millet in Niger/ Tahirou Abdoulaye, John H. Sanders. **Agricultural Systems, Volume 90, Issues 1-3, October 2006, Pages 272-292, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.12.008.** (http://www.sciencedirect.com/science/article/B6T3W-4JCCM67-1/2/f080733577dabc9deab95ca852f222cd) Abstract: New technology introduction in this semiarid region of the Sahel is hypothesized to be made more difficult by three price problems in the region. First, staple prices collapse annually at harvest. Secondly, there is a between year price collapse in good and very good years due to the inelastic demand for the principal staple, millet, and the large changes in supply from weather and other stochastic factors. Thirdly, government and NGOs intervene in adverse rainfall years to drive down the price increases. Marketing strategies were proposed for the first two price problems and a public policy change for the third. To analyze

	this question at the firm level a farm programming model was constructed. Based upon surveying in four countries, including Niger, farmers state that they have two primary objectives in agricultural production, first achieving a harvest income target and secondly achieving their family subsistence objective with production and purchases later in the year. Farmers are observed selling their millet at harvest and rebuying millet later in the year. So the first objective takes precedence over the second. A lexicographic utility function was used in which these primary objectives of the farmer are first satisfied and then profits are maximized. According to the model new technology would be introduced even without the marketing strategies. However, the marketing strategies accelerated the technology introduction process and further increased farmers' incomes. Of the three marketing-policy changes only a change in public policy with a reduction of the price depressing effect (cereal imports or stock releases) substantially increases farmers' incomes in the adverse years. In developed countries crop insurance and disaster assistance is used to protect farmers in semiarid regions during bad and very bad (disaster) rainfall years. In developing countries finding alternatives to the poverty-nutritional problems of urban residents and poor farmers to substitute for driving down food prices in adverse years could perform the same function as crop insurance in developed countries of facilitating technological introduction by increasing incomes in adverse rainfall years in developed countries. **Keywords: Inventory credit; Marketing strategy; Inorganic fertilizers; Fertility depletion; Farm level programming; Micro-fertilization; Sidedressing**
	The impact of different policy environments on agricultural land use in Europe, Agriculture/ H. van Meijl, T. van Rheenen, A. Tabeau, B. Eickhout, Ecosystems & Environment, Volume 114, Issue 1, Scenario-Based Studies of Future Land Use in Europe, May 2006, Pages 21-38, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.11.006. (http://www.sciencedirect.com/science/article/B6T3Y-4J2M6T7-4/2/26346cc93283fca474eaf5155631c944) Abstract: The impact of globalization on trade, production and land use was key to the Doha development round. Although many studies have shown the positive influence of liberalization on trade and production, the environmental questions remain unanswered in most studies. Here we present a combination of an economic (Global Trade Analysis Project, GTAP) and a biophysical (IMAGE) model. The methodology is innovative as it combines state of the art knowledge from both the economic and biophysical worlds. First, the treatment of agriculture and land use is improved in the economic model. For example, information from the OECD Policy Evaluation Model (PEM) was incorporated to improve the agricultural production structure and a new land allocation methodology was introduced using regional land supply curves to facilitate the conversion of idle land to productive land while giving consideration to the level

	of intensification. Secondly, the adapted economic model is linked to the biophysical modeling framework IMAGE allowing feedbacks of detailed heterogeneous information on land productivity to the economic framework. While often a rather pessimistic picture is portrayed for future developments of the agricultural sector in the EU (especially in liberalizing scenarios), our results show that no drastic decrease in land for agricultural purposes is expected for the EU25 the coming 30 years, since the global food market will experience an increase in demand because of expected growth in GDP and population in many developing countries. Moreover, the negative impact of liberalization of agricultural policies on European agricultural land use is small because on the one hand loss in EU's competitiveness leads partly to extensification instead of land abandonment, and secondly, the recent agricultural reforms of the EU changed the protection from market to income support which has less production effects. Changes in land use will be more outspoken in developing countries like Africa. **Keywords: Land use; Trade liberalization; Long-term scenarios; Global Economy Model; Integrated Assessment Model**

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	A consistent valuation and pricing framework for non-commodity outputs: Progress and prospects, Agriculture/ Alan Randall, Ecosystems & Environment, Volume 120, Issue 1, Multifunctionality of Agriculture: Tools and Methods for Impact Assessment and Valuation, April 2007, Pages 21-30, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.03.036. **(http://www.sciencedirect.com/science/article/B6T3Y-4MC0T6D-1/2/d12ade8e632b9e18c7ea1f4f56e4a330)** **Abstract:** The non-commodity outputs of multifunctional agriculture are richly detailed in terms of type, quantity, quality, and accessibility to demanders. An ideal valuation and pricing framework must be sensitive to these details, while dealing consistently with programs varying widely in scale and scope. A consistent valuation and pricing framework is outlined, in which multifunctional agriculture programs generate values (not directly, but via effects that modify the quantity and quality of valued services), and these values (reflecting quantity, quality, and location of services produced) are implemented at the farm level as green prices. Economic valuation methods for non-commodity services are introduced, the empirical literature is summarized, methods of generalizing from that literature are discussed, and the current state of empirical knowledge is assessed. Some strategies are suggested for systematically assessing the economic value of non-commodity outputs of agriculture, and some principles for effectively implementing MFA policy at the farm level are offered. **Keywords: Multifunctional agriculture; Economic value; Valuation framework; Valuation methods; Meta-analysis; Benefits transfer; Aggregation issues; Spatial considerations**

	Are marketing intermediaries exploiting mountain farmers in Nepal? A study based on market price, marketing margin and income distribution analyses/ Deepak M. Pokhrel, Gopal B. Thapa. **Agricultural Systems, Volume 94, Issue 2, May 2007, Pages 151-164, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.08.004.** (http://www.sciencedirect.com/science/article/B6T3W-4M27X8W-1/2/6b7d2417546395d7b41fdba996a7ed84) Abstract: Against the backdrop of viewing marketing intermediaries in developing countries as parasites, this study examined the validity of such a view, especially in the context of mandarin (a species of orange) marketing in a mountain district of Nepal. Necessary information was collected from all major stakeholders such as farmers, collectors and commission agents, and the relative position of farmers in terms of their gains was analyzed by employing three criteria: price of mandarin, marketing margin and income distribution. Income distribution among marketing functionaries 'with' and 'without' transaction cost has been analyzed. Similarly, marketing margin and farmers' share of gross income are also analyzed `with' and `without' the cost of malicious practices by marketing intermediaries. Findings of the study revealed that farmers in the study area are receiving a fair share of the benefit accruing from the marketing of mandarin. However, taking advantage of their weak bargaining power and poor economic condition, marketing intermediaries are harassing and cheating them in different ways. Policy recommendations are made to institutionalize and strengthen the group-marketing system to address such inherent problems. **Keywords: Nepal; Mandarin; Farmers; Marketing intermediaries; Market price; Marketing-margin; Income-distribution; Group-marketing**
	Assessing the critical factors affecting the viability of small-scale dairy farms in the Punjab region of Pakistan to inform agricultural extension programmes/ Philip Cain, Muhammad Anwar, Peter Rowlinson. **Agricultural Systems, Volume 94, Issue 2, May 2007, Pages 320-330, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.10.001.** (http://www.sciencedirect.com/science/article/B6T3W-4MD9KH2-1/2/6d82432ec332b92f1c38d7d5ec69efd2) Abstract: Agriculture in the Punjab province of eastern Pakistan benefits from one of the largest canal irrigation systems in the world. The typical mixed holding is a small, 5 ha mixed farm with three-quarters of its land used for cash crops, such as rice, wheat and sugarcane, and the remainder growing forages such as lucerne and berseem for dairy animals. Both cows and buffaloes are used for milk production, with the latter the more productive. Despite irrigation, productivity is constrained by a slow uptake of new technology such as fertilisers and new plant varieties, and poor livestock management, which leads to extended calving

	intervals, and a lack of available capital. This study used LP models, constructed with original local data on milk and crop production activities, to investigate the effect on profitability of alleviating the main constraints. The results demonstrate the powerful effect of using better, well managed dairy livestock, of increasing the uptake of simple technological improvements and of widening access to credit. They also show the synergy between these elements, for example the importance of finance as part of any intervention strategy. The results should enable agricultural development policy makers to rank the changes and devise better targeted programmes to deliver the changes on farm. **Keywords: Linear programming; Dairy systems; Pakistani agriculture; Rural development**
	Assessing the economic impacts of agricultural carbon sequestration: Terraces and agroforestry in the Peruvian Andes/ John M. Antle, Jetse J. Stoorvogel, Roberto O. Valdivia, Agriculture, Ecosystems & Environment, Volume 122, Issue 4, December 2007, Pages 435-445, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.02.003. **(http://www.sciencedirect.com/science/article/B6T3Y-4NBR8FV-1/2/655a5367a4f48e6a0436ab6da8ad5950)** **Abstract:** There is an increasing demand for information about the economic impact of agricultural carbon (C) sequestration in the developing world, but as yet no studies have assessed the potential for farmers in the highland tropics to participate in C contracts. In this paper we show how an econometric-process simulation model, designed to simulate the value of terrace and agroforestry investments, can be used to assess the economic feasibility of C sequestration. We use this model to simulate the impact of C contracts on the adoption of terraces and agroforestry practices in the highlands of northern Peru. The analysis shows that participation in C contracts could increase adoption of terraces and agroforestry practices, with the rate of adoption depending on the C accumulation rate and key factors affecting terrace productivity such as field slope. The simulation results show there is a relatively low economic potential for C sequestration in this agricultural system at C prices below $50 per MgC, but that potential increases substantially for C prices above $50 per MgC. Under favorable conditions for C sequestration and a C price of $100 per MgC, terrace and agroforesty adoption and C sequestration have the potential to raise per capita incomes by up to 15% on farms with steeply sloped fields, and reduce poverty by as much as 9%. **Keywords: Carbon sequestration; Agriculture; Terrace; Agroforestry; Economic impact; Poverty; Peru**
	Costs and benefits of on-farm nature conservation/ Paul B.M. Berentsen, Astrid Hendriksen, Wim J.M. Heijman, Haske A. van Vlokhoven. Ecological Economics, Volume 62, Issues 3-4, 15 May 2007, Pages 571-579, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.07.026.

	(http://www.sciencedirect.com/science/article/B6VDY-4KVXHR2-2/2/fc90d3da592a2eac9364514ceb4aa217) Abstract: The costs of on-farm nature conservation is an important issue in Dutch agriculture. As nature is a public good, nature conservation cannot do without subsidies from the government. The question of how much farmers should receive in subsidies in order to keep farms engaged in conservation activities is highly topical. In this article, the questions of how much farmers should receive in subsidies and what other factors motivate or demotivate farmers to participate in on-farm nature conservation are addressed. The study was carried out for a particular region in the northern Netherlands and was initiated by the concerns that farmers organisations had about the level of subsidies for landscape conservation as a major form of nature conservation on dairy farms in this region. In this study, both a normative model and a survey were employed. A normative economic dairy farm model was first used to determine differences in income between a typical farm involved in landscape conservation and a typical farm not involved in landscape conservation. Results from the model show that the farm involved in conservation earned a lower income than the farm not involved in conservation. This was due to the first farmer's smaller scale, lower intensity and lower productivity. The lower income, however, was compensated for by conservation subsidies. Next, a survey concerning on-farm nature conservation in general was carried out among the farmers in this area. From the survey results, it appeared that the majority of the respondents were satisfied, at least to some extent, with the level of subsidies for on-farm nature conservation. Moreover, the survey also revealed that the farmers' commitment to their natural environment strongly motivates farmers to get involved in on-farm nature conservation schemes, whereas the uncertainty about regulations and the feeling of being controlled too much demotivate them. The results show the complementarity of the two methods. The findings of the survey confirm the main findings of the normative model calculations, and, moreover, the survey reveals that in addition to monetary compensation, other factors play a role for farmers in the decision to get involved in on-farm nature conservation. **Keywords: On-farm nature conservation; Landscape conservation; Agriculture; Dairy farming; Farm modeling; Survey**
	Economic and ecological consequences of four European land use scenarios/ B. Eickhout, H. van Meijl, A. Tabeau, T. van Rheenen, Land Use Policy, Volume 24, Issue 3, Integrated Assessment of the Land System: The Future of Land Use, July 2007, Pages 562-575, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2006.01.004. **(http://www.sciencedirect.com/science/article/B6VB0-4M1DB5W-1/2/cb7961900bd2ae4b241b1b587c8161e5)**

	Abstract: The impact of globalization on trade, production and land use is key to the Doha development round. This paper deals with the complex interaction between agricultural trade, production, land-use change and environmental consequences on the basis of four different scenarios. In these scenarios, major uncertainties from trade liberalization to maintained regional trade blocks are considered. Although economic growth is apparent in liberalizing scenarios, we also found that environmental threats of climate and nutrients to the sustainability of the global agricultural practices pose new challenges to future food production. Since most of the environmental threats will be experienced in tropical regions where most of the increase in population and food and feed demand is expected, an indirect pressure on the European agricultural market is likely. For the coming decades European agriculture is expected to decrease slightly, especially in liberalizing worlds. New demand for land for biofuels, carbon plantations and the global food market, will prevent the European agricultural sector from being eliminated. Moreover, current EU policies already result in less vulnerable farmers to additional liberalizing policies. Therefore, we conclude the global context is important for future European land use, especially in futures where environmental policies are ignored. Therefore, we conclude that environmental and trade agreements must be sufficiently integrated or coordinated, to assure they work together to improve the environment and attain the benefits of free trade. **Keywords: Trade liberalization; Economic benefits; Environmental consequences; Climate change; Land use; Scenarios**
	Economic appraisal of profitability and sustainability of peri-urban agriculture in Bangkok/ Isabelle Vagneron, Ecological Economics, Volume 61, Issues 2-3, 1 March 2007, Pages 516-529, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.04.006. **(http://www.sciencedirect.com/science/article/B6VDY-4KCGHYX-1/2/d6ef2fb88e0a43be0c959e4d7dd14d41)** **Abstract:** Promoters of urban and peri-urban agriculture generally stress its positive role in terms of food security, income, employment and improvement of the urban environment. Unfortunately, competition with agricultural and non-agricultural uses of peri-urban farm land often translates into intensive farming systems that are detrimental to the environment. Based on two original surveys of peri-urban farms in the area of Bangkok, this paper ranks four cropping systems (fish, shrimp, rice, and fruits) according to their economic profitability. A second step of the analysis aims at taking into account the cost of water into the analysis, so as to assess whether the hierarchy formerly established is modified. Although all environmental costs are not introduced and environmental benefits are ignored, this work paves the way for further research in the area of taking into account the environmental impact of farming activities. **Keywords: Environmental economics; Peri-urban agriculture; Asia;**

	Thailand
	Economic dependence on forest resources: A case from Dendi District/ Getachew Mamo, Espen Sjaastad, Pal Vedeld. **Ethiopia, Forest Policy and Economics, Volume 9, Issue 8, May 2007, Pages 916-927, ISSN 1389-9341, DOI: 10.1016/j.forpol.2006.08.001.** (http://www.sciencedirect.com/science/article/B6VT4-4M27XBR-2/2/37ac8b5762560aea24ada14acf4e814b) Abstract: This paper examines variation in dependence on forest resources among rural households in Chilimo, Ethiopia, and the income-equalizing effects of such resources. Data were collected through a systematic questionnaire survey of 102 households, randomly selected from two peasant associations in the area. Forest income contributed 39% of the average household income, roughly equal to agriculture, which contributed 40%. Forest income was more important than all other income sources combined for the poorest 40% of households and contributed more to household income than agriculture for 65% of households. While forest income represents 59% of the total household income for the poorest quintile, the contribution drops to 34% for the wealthiest quintile. On the other hand, the rich households derive a larger absolute income from forest resources than the poor households. Forest resources have an important income-equalizing potential among the rural households. Reduced access to forest resources would greatly affect the welfare of the rural population and increase wealth differentiation among rural households in the study area. **Keywords: Forest income; Economic dependence; Income distribution; Rural livelihoods; Ethiopia**
	Economic instruments and the environmental accounts/ Viveka Palm, Maja Larsson. Ecological Economics, Volume 61, Issue 4, Special Issue on Environmental Accounting: Introducing the System of Integrated Environmental and Economic Accounting 2003 - SEEA-2003 S.I., 15 March 2007, Pages 684-692, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.01.015. (http://www.sciencedirect.com/science/article/B6VDY-4M9H3SR-1/2/0cbf9de7bcb111f17fc7afe67cf7495f) Abstract: The Nordic countries have now had experience with environmental taxes and subsidies as a major component of their environmental policy over an extensive period of time. The Swedish System of Environmental and Economic Accounts (SEEA) include environmental taxes and subsidies as part of the official statistics. This article presents the accounts for taxes and subsidies, linked to the accounts for emissions data by industry. It demonstrates disparities between emissions and environmental taxes, as well as where industries or environmental problems are not regulated. The data show that in Sweden economic instruments are always aimed at particular actors or areas, and are never quite as

	comprehensive as recommended by economic theory. The environmental taxes are primarily aimed at fossil fuel use and related emissions, and have been mostly applied to the household sector and services sector, while industry often has been given exemptions due to concerns about international competition. The environmentally motivated subsidies are mainly directed to agriculture, fishing and research on renewable resources. A fully developed international data set on taxes and subsidies would provide a sound base for comparing the impact on international competitiveness. Eurostat is promoting the use of environmental accounts data for its member countries by harmonizing methods and engaging in publication of international comparisons. **Keywords: Data-bases; Taxes; Subsidies; Trade; Emissions; International comparability; SEEA**
	Environmental co-operatives as instruments for delivering across-farm environmental and rural policy objectives: Lessons for the UK/ J.R. Franks, A. Mc Gloin. **Journal of Rural Studies, Volume 23, Issue 4, October 2007, Pages 472-489, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2007.03.002.** (http://www.sciencedirect.com/science/article/B6VD9-4NM5XRJ-1/2/48ed2b8f37b290f00c020d7fa70545f7) Abstract: This paper assesses the potential of environmental co-operatives (EC) to deliver environmental benefits and an integrated and strengthened rural economy in the UK. It is based on research into Dutch EC, which have about 10,000 members, of which a quarter are non-farmers. The paper details the benefits EC have delivered to their members, the Dutch Ministry of Agriculture, the environment and the rural economy using evidence drawn from interviews with farmer and non-farmer members, farmer non-members, policy makers and academics connected with seven EC. It pays particular attention to the benefits and disadvantages of allowing non-farmer membership. It is argued that EC would be a valuable additional instrument to help deliver landscape-scale environmental, regional and rural policy objectives. However, Dutch EC have received important political and, particularly in their start-up stage, financial support, and similar support would be needed in the UK--it is argued this may be more readily available if UK EC will offer non-farmer membership. Appropriate support could be provided through developments to the Environmental Stewardship Scheme's higher level tier, by safeguarding and extending the spirit of the LEADER plus programme (which explicitly supports collective action) to the delivery of environmental benefits, and/or by encouraging the development of locally based social enterprises. **Keywords: Co-operation; Environment; Farmers; Non-farmers; Landscape-scale; Rural economy**
	Integrating environmental and economic performance to assess modern silvoarable agroforestry in Europe/ J. Palma, A.R. Graves, P.J. Burgess, W.

	van der Werf, F. Herzog. **Ecological Economics, Volume 63, Issue 4, Sustainability and Cost-Benefit Analysis, 15 September 2007, Pages 759-767, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.01.011.** (http://www.sciencedirect.com/science/article/B6VDY-4N6FVF1-2/2/984ea8080244dbeb6176c9df0376a1ce) Abstract: The environmental and economic performance of silvoarable agroforestry in Europe is highly variable. Multi-criteria analysis, using the PROMETHEE outranking approach, was used to evaluate the integrated performance of silvoarable agroforestry on hypothetical farms in nineteen landscape test sites in Spain, France, and The Netherlands. The silvoarable scenarios allocated a proportion of the hypothetical farms (10 or 50%) to silvoarable agroforestry at two different tree densities (50 or 113 trees ha- 1) on two different qualities of land (best or worst quality land). The status quo (conventional arable farming) was also assessed for comparison. The criteria used in the evaluation (soil erosion, nitrogen leaching, carbon sequestration, landscape biodiversity, and infinite net present value) were assessed at each landscape test site; infinite net present value was assessed under six levels of government support. In France, the analysis showed, assuming equal weighting between environmental and economic performance, that silvoarable agroforestry was preferable to conventional arable farming. The best results were observed when agroforestry was implemented on 50% of the highest quality land on the farm; the effect of tree density (50-113 trees ha- 1) was small. By contrast, in Spain and The Netherlands, the consistently greater profitability of conventional arable agriculture relative to the agroforestry alternatives made overall performance of agroforestry systems dependent on the proportion of the farm planted, and the tree density and land quality used. **Keywords: Land use alternatives; Erosion; Nitrogen leaching; Carbon sequestration; Landscape biodiversity; Net present value; Agricultural policy; Multicriteria decision; Promethee**
	Is Price a Barrier to Eating More Fruits and Vegetables for Low-Income Families?/ Diana Cassady, Karen M. Jetter, Jennifer Culp. **Journal of the American Dietetic Association, Volume 107, Issue 11, November 2007, Pages 1909-1915, ISSN 0002-8223, DOI: 10.1016/j.jada.2007.08.015.** (http://www.sciencedirect.com/science/article/B758G-4PXP0WM-2/2/d97db008a3eb4d4d67c900bc498cc41c) Abstract: Objective To determine if price is a barrier to fruit and vegetable consumption for low-income families by comparing the average cost of a market basket of fruits and vegetables from the Thrifty Food Plan and the Dietary Guidelines for Americans 2005 (2005 Dietary Guidelines), investigating variations in price by

	neighborhood income and by type of supermarket, and estimating the influence of a 2005 Dietary Guidelines fruit and vegetable basket on the food budget of a low-income family.Design A market basket survey was conducted at 25 supermarkets across three time periods to allow for seasonal variation in produce prices.Setting Stores were selected from census tracts with a variety of income levels in Sacramento, CA, and Los Angeles, CA.Main outcome measures The average cost of a Thrifty Food Plan and 2005 Dietary Guidelines market basket for fruits and vegetables.Statistical analyses performed Student t tests were used to compare the mean cost of market baskets.Results The 2005 Dietary Guidelines market basket cost 4% less than the Thrifty Food Plan ($P<0.001$), and was significantly less expensive in low-income areas at $65 ($P<0.05$), and in bulk supermarkets at $59 ($P<0.05$). The 2005 Dietary Guidelines market basket would require a low-income family to devote 43% to 70% of their food budget to fruits and vegetables.Conclusions Public policies should examine ways to make fruits and vegetables more affordable to low-income families.
	MFA model to assess economic and environmental consequences of food production and consumption/ Helmi Risku-Norja, Ilmo Maenpaa, Ecological Economics, Volume 60, Issue 4, 1 February 2007, Pages 700-711, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.05.001. (http://www.sciencedirect.com/science/article/B6VDY-4K9C5FP-1/2/ec533f3328ac955b9cf2852f5f1658b6) **Abstract:** Agri-food sector is a crucially important part of the society, because it is a major factor affecting public health and welfare and it also contributes - directly and indirectly - both to the environment and to the national gross product and employment. Improving sustainability of the agri-food sector implies production of nutritionally better food by using fewer inputs and by reducing environmental burden. In reducing environmental burden, it is essential to restrict the material throughput, to identify the hot spots and direct the measures to them. Improving performance of the food sector requires that the benefits and inputs be quantified in an unambiguous way and that the inputs are estimated for the whole production chain. A comprehensive view of the whole system is necessary. Here, the material flow approach (MFA) has been used to describe the Finnish food flux. The quantitative numerical data have been derived from the farm models' data base, and the data have been adjusted so as to comply with the production and consumption statistics of Finland. Using the compiled data an extended input-output model has been constructed. The model allows for the evaluation of some of the economic and environmental consequences, when the structure of food production and the patterns of food consumption are changed. The consequences can be traced within agriculture, within the food sector as a whole, or at the level of the nation-wide economy. In combination with other

	information the model, thus, serves as a practical tool for planning. The paper at hand gives an overview of the data base and the basic calculation principles of the model. The usability of the model is demonstrated with results from modelling examples, in which the share of organic production or the share of vegetarian food in the average Finnish diet has been increased. The possibilities and restrictions of the approach as well as some of the needs for further development are discussed. The study is the first step in developing MFA methods to analyse and to monitor the material flows of the Finnish food flux. The results have been used also in compiling the Finnish physical input-output tables. The study, thus, contributes to the overall development of the materials flow accounting. **Keywords: Agriculture; Economics; Environment; Food production and consumption; Input-output model; Material flow accounting and analysis (MFA)**
	Modelling farm-level economic potential for conversion to organic farming/ Eva Kerselaers, Lieve De Cock, Ludwig Lauwers, Guido Van Huylenbroeck, Agricultural Systems, Volume 94, Issue 3, Special Section: sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 671-682, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.02.007. **(http://www.sciencedirect.com/science/article/B6T3W-4NH6D0G-1/2/54f9db1885d895c276fe05271aa72bb8)** **Abstract:** This paper discusses linear programming simulations at individual farm-level of potential income changes that may result from conversion to organic farming. The model is based on both conventional farm accountancy data and additional conventional and organic farm data from sector expertise and literature. The model is applied for Belgian agriculture. Simulations show that economic potential for conversion is higher than generally perceived, provided that farmers are willing to change farm management practices. However, the economic conversion potential (ECP) is not positive for all farms, not even when an optimal conversion process is assumed and it depends on farm type and farm characteristics. Additionally, due to higher risk and liquidity problems during the transition period, the positive results need to be put into perspective. Nevertheless, the differentiated ECP calculations can give new insights supporting farm-level policy choices with respect to conversion to organic farming. **Keywords: Organic farming; Economic potential; Transition period; Farm model; Linear programming; Simulation**
	Multi-scale analysis of agricultural development: A modelling approach for Ilocos Norte, Philippines/ Alice G. Laborte, Martin K. Van Ittersum, Marrit M. Van den Berg.

	Agricultural Systems, Volume 94, Issue 3, Special Section: sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 862-873, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.11.011. (http://www.sciencedirect.com/science/article/B6T3W-4MSY8PC-5/2/c049cb24b0f98bd926f40d077961aed7) Abstract: Decisions and policies that have implications on allocation of resources are made at different levels. Goals at different scales may be conflicting and decisions at one scale have consequences for those at other scales. Performing analyses at more than one scale is, therefore necessary in analysing future options for resource use. This paper illustrates the use of a multi-scale method enabling assessment of multi-purpose natural resource management options. Three examples of analyses that it allows are presented for Ilocos Norte province in the Philippines, at the farm household, municipal (Batac municipality) and provincial levels. Results show that: (1) Differences in resource endowments of farm households strongly affect the potential adoption rates of five well-defined alternative technologies. (2) Limited markets, inadequate infrastructure and resource endowments of farm households have large effects on resource use and goal achievement in the municipality. Not including these factors in a resource use analysis results in a so-called aggregation bias. As these are significant, ignoring them may result in misleading simulation results and policy conclusions. The aggregation bias resulting from assuming spatially fixed input and output prices is significant for Batac, which has poor farm-to-market roads. This suggests large potential benefits from improving infrastructure. The factors investigated suggest that aggregate income in the municipality is most strongly affected by the size of the market for some vegetables. (3) The differences in resource allocations resulting from prioritizing objectives at different levels reveal potential conflicts. The municipal income was highest with crops which pose more risk to farmers; our farm household analysis shows that farmers tend not to select too much of these crops. Similarly, the provincial income is highest when resources in the province are allocated such that more of the staple crop rice and less of the highly profitable cash crops are cultivated in Batac, resulting in lower income for the municipality. It is anticipated that the presented multi-scale approach will provide valuable information for joint-learning, policy discussions and decision-making regarding agricultural land use. **Keywords: Multi-scale analysis; Linear programming; Natural resource use; Farm household model; Policy analysis**
	Policy reforms, rice production and sustainable land use in China: A macro-micro analysis/ Nico Heerink, Futian Qu, Marijke Kuiper, Xiaoping Shi, Shuhao Tan. Agricultural Systems, Volume 94, Issue 3, Special Section:

	sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 784-800, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.11.005. (http://www.sciencedirect.com/science/article/B6T3W-4MSY8PC-4/2/e25e3fa60001b9a3dbcbc6d6830c997c) Abstract: This paper presents a macro-micro analysis of the impact of policy reforms in China on agricultural production, input use and soil quality change for a major rice-producing area, namely Jiangxi province. This is done in three steps. First, a quantitative assessment is made of the impact of market liberalization policies on the economic environment of farm households in Jiangxi province. Econometric analyses based on provincial, national and world market data are used to explain changes in rice and fertilizer prices in Jiangxi province over time. Next, the impact of China's recent income support policy and latest price trends on farm household choices with respect to activity choice (particularly rice and livestock) and input use (fertilizers, pesticides, manure) is assessed for two villages with different degrees of market access in north-east Jiangxi province. Two village-level general equilibrium models are used to analyse household decision-making and interactions between households within these villages. The parameters are estimated and calibrated from an extensive survey held in these villages in the year 2000. Finally, the impact of land tenure policy on farm management decisions (labour, manure and chemical input use), soil quality (available P and K and total N and C) and rice yields is analysed through an econometric analysis of plot-level data for three villages. Two-stage least squares (2SLS) is used to control for interactions with yields and for feedbacks towards input use. The paper ends with a number of suggestions for policy adjustments that would reduce the problem of natural soil compaction in the research area. **Keywords: Market policy; Rural income policy; Land tenure; Price changes; Input use; Soil quality; Village economy; Household responses**
	Poverty and biodiversity trade-offs in rural development: A case study for Pujiang county, China/ Huib Hengsdijk, Wang Guanghuo, Marrit M. Van den Berg, Wang Jiangdi, Joost Wolf, Lu Changhe, Reimund P. Roetter, Herman Van Keulen. **Agricultural Systems, Volume 94, Issue 3, Special Section: sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 851-861, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.11.018.** (http://www.sciencedirect.com/science/article/B6T3W-4MV71SG-1/2/1133d8595d2196175e61cec1a35836d1) Abstract: Both, poverty reduction and preservation of biodiversity are high on the global

	agenda on sustainable development. The relationships between poverty, biodiversity of agro-ecosystems and agricultural development are complex and poorly understood. In this paper, we present an integrated framework for analysis of agricultural development and natural resource management options at agro-ecosystem level, using Pujiang county, in Zhejiang province, China as a case study area to perform the analysis. A regional linear programming (LP) model is applied, maximizing regional economic surplus, given production and labour market conditions in Pujiang. We use the model to examine the consequences for a set of regional poverty and biodiversity indicators, of four so-called poverty reduction strategies, i.e., (i) intensification of production, (ii) diversification towards livestock production, (iii) land expansion, and (iv) an exit from agriculture. The analysis indicates that diversification is the most promising poverty reduction strategy, but requires efficient use of animal manure in cropping systems to avoid environmental problems. Improved nutrient management in cropping systems is effective in reducing the regional nitrogen surplus, but less effective in increasing per capita income. The exit strategy is effective in reducing poverty and achieving biodiversity goals, but may have important social consequences that are not addressed in this study. Further reduction in rural poverty is hampered by labour constraints during the harvesting period in high value crops such as vegetables and fruits, which calls for research and development in the field of agricultural mechanization. **Keywords: Diversification; Intensification; Environment; LP; Sustainability; Ecosystem approach**
	Profiles of US farm households adopting conservation-compatible practices/ Dayton M. Lambert, Patrick Sullivan, Roger Claassen, Linda Foreman. Land Use Policy, Volume 24, Issue 1, January 2007, Pages 72-88, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2005.12.002. (http://www.sciencedirect.com/science/article/B6VB0-4JB9W12-1/2/f8cbd8eb425625d59aa10a2696e69083) Abstract: In recent years, the United States (US) government has put increasing emphasis on conservation programs geared toward rewarding good stewardship on working farmland. And, while the United States Department of Agriculture's (USDA) farmland retirement programs continue to command the lion's share of the conservation budget, roughly 80 percent of current land retirement contracts are due to expire before the end of the decade. With the 2007 US farm bill debate underway, policy makers will be making decisions about the future direction of farm conservation efforts. This paper examines the business, operator, and household characteristics of farms that have chosen to adopt conservation-compatible practices, with and without financial assistance from conservation programs. It sheds light on the relationship between adoption of conservation-compatible practices and conservation behavior, and how this relationship varies between farm business, operator, and household characteristics. Findings indicate that farm operator and household attributes, and farm business

	characteristics, affect the likelihood that a farmer adopts certain kinds of conservation-compatible practices. **Keywords: Conservation programs; Conservation management practices; Conservation structures; Farm households; Conservation reserve program; Environmental quality incentives program**
	Protectionary bias in agriculture: A pure economic argument/ Sugata Marjit, Saibal Kar, Hamid Beladi, Ecological Economics, Volume 63, Issue 1, 15 June 2007, Pages 160-164, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.10.012. (http://www.sciencedirect.com/science/article/B6VDY-4MH2C13-4/2/73f0778d4a2e2c6fbec2a2ae341fe488) **Abstract:** Empirical evidence suggests that the agricultural sector in the developed countries has enjoyed a greater degree of protection than the import-competing manufacturing sectors. Usually this is attributed to strong farm lobbies and hence on political factors. We provide a theoretical model and a possible explanation of this phenomenon based on purely economic arguments. Two importables are accommodated in a three-good three-factor model of trade and production, one is a labor-intensive manufacturing good and the other is an agricultural commodity. This captures the trade pattern of a typical industrialized country with an agricultural sector such as Europe and the USA. We show that uniform tariffs in agriculture and labor-intensive manufacturing will definitely hurt the land owners in real terms and may reduce their absolute return. Hence, if there has to be protection, it has to be biased in favor of agriculture. **Keywords: Protection; Tariff; Agriculture**
	Residual soil nitrogen in soil landscapes of Canada as affected by land use practices and agricultural policy scenarios/ J.Y. Yang, E.C. Huffman, R. De Jong, V. Kirkwood, K.B. MacDonald, C.F. Drury. **Land Use Policy, Volume 24, Issue 1, January 2007, Pages 89-99, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2006.03.002.** (http://www.sciencedirect.com/science/article/B6VB0-4JYKKYR-1/2/5c2e133b0b1c8b0a90b559f46c4d6179) Abstract: Agri-environmental indicators are being developed in Canada to assess and report on the environmental sustainability of agricultural production activities. Concerns about water quality have led to the development of an indicator called residual soil nitrogen (RSN), which reflects annual nitrogen left in the soil profile after crops are harvested. The Canadian agricultural nitrogen budget (CANB) is used to integrate this indicator with the economic Canadian regional agriculture model (CRAM) to assess the implications of national and regional agricultural policy scenarios. CANB has built-in scaling-up and scenario-analysis capabilities, so that its outputs can be generated and mapped at the soil

	landscapes of Canada (scale 1:1 million) level, as well at provincial and national scales. Using census of agriculture data for 1981 and 1996, the CANB model predicted RSN levels across Canada for 2008. The impacts of CRAM policy scenarios in the year 2008, which include changes in crop areas, animal numbers, fertilization and animal feeding practices, each with a low, medium and high level of adoption, are evaluated in terms of changes in RSN compared to a 2008 `business as usual' scenario. National average RSN values are projected to increase from 21.8 kg N/ha in 1981 to 36.5 kg N/ha in the 2008 `business as usual' scenario. Between 1996 and 2008, the proportion of farmland containing greater than 40 kg of excess N/ha increased from 18% to 34% in response to increased fertilizer use, increased manure application and increases in the area of legume crops. Changes in land use practices, such as decreasing the summerfallow area or switching some annual cropland to perennial forages and forestry, appear to have a minimal effect on RSN levels as compared to the `business as usual' scenario. However, policy scenarios that improve nitrogen fertilization and animal feeding practices were found to significantly decrease RSN levels and thereby reduce the risk of nitrate contamination of the environment. **Keywords: Residual soil nitrogen; Census of agriculture; Agricultural policy scenarios; Nitrogen modeling; Scaling up; Soil landscapes of Canada**
	Review of methods and evidence for economic valuation of agricultural non-commodity outputs and suggestions to facilitate its application to broader decisional contexts/ Livia Madureira, Tina Rambonilaza, Isabella Karpinski, Agriculture, Ecosystems & Environment, Volume 120, Issue 1, Multifunctionality of Agriculture: Tools and Methods for Impact Assessment and Valuation, April 2007, Pages 5-20, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.04.015. **(http://www.sciencedirect.com/science/article/B6T3Y-4MJBTCV-1/2/54abb0a7cc27b09836ba5b17c2e23acd)** **Abstract:** Economic valuation provides information for the relative values of environmental and recreational spatial services and other goods such as healthy and safe food, whose promotion is now envisaged by EU in the context of a multifunctional agriculture (MFA) model. Therefore, economic valuation is a valuable tool for MFA assessment. However, the promotion of MFA at EU level necessitates the scaling up of assessment methods, particularly if the corresponding policies are to receive a sympathetic hearing by the WTO. Thus, the usefulness of economic valuation in the MFA context depends on its ability to obtain scaled-up estimates. This paper is a review of the current state of the art for the agricultural non-commodity outputs valuation methods, their application and respective value estimates. A special focus has been given to the European countries of France, Germany and Portugal, because these were the object of a relatively detailed and extensive survey of case-studies addressing valuation of agriculture-related NCOs (non-commodity outputs), undertaken in the

	MULTAGRI project. The main conclusions of the review were: (1) the prevalence of stated preference valuation methods; (2) the resort to crudely defined 'landscapes' to index spatial-based environmental and recreational services; (3) the regional scope of valuation studies; (4) that most of the case-studies offered ex ante value estimates for actual or simulated changes in the provision level of agriculture-related NCOs, linked to conservation or restoration policies, projects or programmes. Furthermore, the review highlights some promising practices to improve the selection and specification of attributes, such as the option for a multi-attribute valuation approach and the resort to multidisciplinary data and modelling. These practices have been incorporated into a proposal for an integrative valuation framework to improve NCO specification at the broader scale and to respond to the end-users information demands. **Keywords: Economic valuation; Agricultural non-commodity outputs; Assessment of multifunctionality in agriculture; Stated preference techniques; Multi-attribute valuation; Valuation of land-based services; Land-use change valuation**
	Simulating soil fertility and poverty dynamics in Uganda: A bio-economic multi-agent systems approach/ Pepijn Schreinemachers, Thomas Berger, Jens B. Aune, Ecological Economics, Volume 64, Issue 2, Special Section - Ecosystem Services and Agriculture - Ecosystem Services and Agriculture, 15 December 2007, Pages 387-401, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.07.018. **(http://www.sciencedirect.com/science/article/B6VDY-4PP23GB-1/2/90199a01713e7f2373072dec5fbfbddb)** **Abstract:** Declining soil fertility and increasing rural poverty are major problems facing sub-Saharan agriculture. Bio-economic modeling has been used to analyze the complex interaction between ecological sustainability and rural poverty as well as to explore policy options promoting sustainable development. This paper shows that these models can be further advanced by adopting an agent-based modeling approach. This gives a more realistic representation of diversity in socioeconomic and biophysical terms, allows local interaction between households, and can yield an ex-ante assessment of the distributional consequences of policy intervention. This paper describes the modeling approach and illustrates it with an empirical application to two village communities in the Lake Victoria Crescent of Uganda. It is shown how the model system can be calibrated with and validated against empirical data. The model is used to analyze the potential effect of short-term credit, mineral fertilizer, and improved maize seed on poverty and sustainability. Simulation results suggest substantial reductions in poverty although the incidence of poverty would remain high and these innovations alone would have little effect on the long-term ecological sustainability of the system. **Keywords: Agent based modeling; Agriculture; Integrated**

	modeling; MP-MAS; Technology diffusion; Tropical soil productivity calculator
	Statistical modeling of land-cover changes based on key socio-economic indicators/ Elke Hietel, Rainer Waldhardt, Annette Otte, Ecological Economics, Volume 62, Issues 3-4, 15 May 2007, Pages 496-507, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2006.07.011. **(http://www.sciencedirect.com/science/article/B6VDY-4KJV36H-2/2/a22c1622e27c042d27723967ab44b130)** **Abstract:** Landscapes are complex human-environment systems operating at spatio-temporal scales. Time is just as important as space when researching landscape changes. These changes are influenced by both environmental and socio-economic factors. However, correlations between environmental landscape attributes and land-cover patterns/changes are weakened by human activities such as intensification of agriculture eliminating the constraints of water and nutrient availability. Relations between changes in socio-economic organisation and land cover become apparent only over a longer period of time. Thus, in our study, we focused on socio-economic factors and their long-term effects on land cover. We present a method to (i) differentiate types of land-cover changes at district level, (ii) model correlations between socio-economic factors and land cover changes and (iii) identify key socio-economic indicators of land-cover changes between 1945 and 1999 in a German marginal rural landscape. We employed agricultural land-cover data gained from the interpretation of multi-temporal aerial photographs. Based on these data, we differentiated types of land-cover changes, characterising different directions of agricultural land-cover changes in the observation time period. Various socio-economic aspects were considered by introducing data representing factors of demography, employment, economy, infrastructure, agricultural structure and policy. The relations between time series of land-cover data and of socio-economic data were modeled with the help of redundancy analysis. Correlation coefficients were used to identify key socio-economic indicators of land-cover changes. The results showed that a relatively high percentage of variance in land-cover data can be explained by socio-economic factors. The types of land-cover changes can be characterised by combinations of key socio-economic indicators. The indicators can be helpful to reconstruct land-cover changes in other regions. Thus, they provide a basis for the development of sustainable land-cover management systems. **Keywords: Agricultural land-cover changes; German marginal rural landscape; RDA; Statistical model; Spatio-temporal correlations; Socio-economic indicators**
	The impact of water and agriculture policy scenarios on irrigated farming systems in Italy: An analysis based on farm level multi-attribute linear programming models/ F. Bartolini, G.M. Bazzani, V. Gallerani, M. Raggi,

	D. Viaggi. **Agricultural Systems, Volume 93, Issues 1-3, March 2007, Pages 90-114, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.04.006.** (http://www.sciencedirect.com/science/article/B6T3W-4K7FJNR-1/2/ffad6de19fc5b7a2d1627d74bba9ad31) Abstract: The objective of this paper is to evaluate the impacts of agriculture and water policy scenarios on the sustainability of selected irrigated farming systems in Italy, in the context of the forthcoming implementation of the directive EC 60/2000. Directive EC 60/2000 (Water Framework Directive) is intended to represent the reference norm regulating water use throughout Europe. Five main scenarios were developed reflecting aspects of agricultural policy, markets and technologies: Agenda 2000, world market, global sustainability, provincial agriculture and local community. These were combined with two water price levels, representing stylised scenarios for water policy. The effects of the scenarios on irrigated systems were simulated using multi-attribute linear programming models representing the reactions of the farms to external variables defined by each scenario. The output of the models consists of economic, social and environmental indicators aimed at quantifying the impact of the scenarios on different aspects of sustainability relevant for irrigated farming systems. Five Italian irrigated farming systems were considered: cereal, rice, fruit, vegetables and citrus. The results show the diversity of irrigated systems and the different effects that water pricing policy may produce depending on the agricultural policy, market and technological scenarios. They also highlight a clear trade-off between socio-economic sustainability and environmental (water, nitrogen, pesticide) sustainability. Water pricing will have, in most cases, less impact than agricultural markets and policy scenarios, though it appears to be an effective instrument for water regulation in the least intensive irrigated systems considered. This emphasises the need for a differentiated application of the Water Framework Directive at the local level as well as a more careful balance of water conservation, agricultural policy and rural development objectives. **Keywords: Water Framework Directive; Common Agricultural Policy; Irrigation; Multi-Attribute Analysis; Linear programming; Sustainability indicators**
	The Impact of Water Pricing Policy on Local Environment - An Analysis of Three Irrigation Districts in China/ Hong-yun HAN, Lian-ge ZHAO. **Agricultural Sciences in China, Volume 6, Issue 12, December 2007, Pages 1472-1478, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60010-3.** (http://www.sciencedirect.com/science/article/B82XG-4RJBPV7-B/2/92905c25be46db7d4dbede61974ff859) Abstract: As a high priority in dealing with the problem of water scarcity, the effect of

	water pricing policy remains a controversial issue, especially the environmental effect. Using household-level panel data of three irrigation districts (IDs) in the northern China, this paper probes the potential impact of water price rising on local environment. The examination shows that farmers will reduce the rice area as a response to the rising surface water prices. The changing cropping pattern will exert three-fold environmental impacts, including the dropping groundwater level resulting from the reduction of seepage and percolation of irrigated water and overexploitation of groundwater, the negative effect of non-point pollution from fertilizer and pesticide application, and the loss of field irrigation facilities. Water pricing is not a valid means of significantly reducing agricultural water consumption due to the substitution of groundwater for surface water, it will lead to negative environmental effect. It is an imperative task for Chinese government to improve the management efficiency at IDs. **Keywords: water pricing; water demand; irrigation district; non-point pollution; environmental effect**
	The political economy of a productivist agriculture: New Zealand dairy discourses/ Mairi Jay, Food Policy, Volume 32, Issue 2, April 2007, Pages 266-279, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2006.09.002. (http://www.sciencedirect.com/science/article/B6VCB-4M936VW-1/2/b46d28f0f31183861d02a1a855f47469) **Abstract:** The New Zealand dairy industry faces political and commercial pressure to improve its environmental performance on the one hand while maintaining economic efficiency and commercial competitiveness in a global marketplace on the other. The growing scale and intensity of dairy production have caused significant cumulative environmental impacts. The industry response to political pressures for improved environmental performance has involved a narrow focus on water quality and pasture management. It is consistent with an approach which seeks to maintain size and industrial leverage in the face of global trade competition. This paper explores the productivist constructions of environmental management by the New Zealand dairy industry in the context of global economic competition and notes an alternative response inspired by an ethic of sustainability. It suggests that despite global pressures of economic competition, it is possible to incorporate non-material values into farm management provided these are recognised and rewarded. **Keywords: Agri-environmental practices; Sustainable agriculture; Dairy farming; Productivism; Political economy; New Zealand**

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	Analysis of the Management Policy and Comprehensive Benefit of Agriculture in the Rural Area: A Case Study on Pujiang County, China/ FANG Bin, MENG Ying. Agricultural Sciences in China, Volume 7, Issue 11, November 2008, Pages 1403-1412, ISSN 1671-2927, DOI: 10.1016/S1671-

	2927(08)60191-1. (http://www.sciencedirect.com/science/article/B82XG-4V0M7MN-J/2/d3b59e2d9f186d187bd60b37d64d0d90) Abstract: To solve the problems of the poverty in rural areas and raise the output efficiency of agriculture, policy is the primary factor. Guiding by good policies, the design of agricultural structure and management technology are the two main technical supports for agricultural development. The authors apply the model to determine the consequences of four so-called poverty alleviation strategies: (i) intensification of production, (ii) diversification of livestock production, (iii) land expansion, and (iv) an exit from agriculture, with a set of regional poverty and biodiversity indicators. Diversification seems to be the most promising poverty reduction strategy, but requires an efficient use of animal manure in cropping systems to avoid environmental problems. Improved nutrient management in cropping systems is effective in reducing the regional nitrogen surplus, but less effective in increasing per capita income. The exit strategy is beneficial for reducing poverty and achieving biodiversity goals, but may have important social consequences, which are not addressed in this study. Further reduction of rural poverty is hampered by labor constraints during the harvesting period of high value crops, such as vegetables and fruits, which calls for research and development in the field of agricultural mechanization. **Keywords: diversification; intensification; LP; sustainability; ecosystem approach**
	Economic impacts of shifting sloping farm lands to alternative uses/ Xianchun Liao, Yaoqi Zhang. **Agricultural Systems, Volume 97, Issues 1-2, April 2008, Pages 48-55, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.11.002.** (http://www.sciencedirect.com/science/article/B6T3W-4RN48JP-1/2/32926615228be8f796fd211950e71611) Abstract: China has been engaging in one of the world's largest ecological conservation programs, the Slope Land Conversion Program (SLCP), which is also called the grain-for-green policy. This paper is intended to address the economic impacts of shifting from farm lands to four other land use options using land expectation value (LEV). Sensitivity analyses are conducted to examine the impacts by changing interest rates, prices, wage, and tax rates. Current subsidy program is examined as well. The results show that farmers would suffer more losses for planting pine and orchard trees (citrus and chestnut) and tea when interest rates increase. In addition, planting pine trees, orchard trees, and tea create more benefits than annual crops when wage rates increase by 25%. The provision of subsidies by the government could reduce loss from shifting farm lands to alternative uses, but under the current situation (interest rate, price, wage rate and subsidy program), farmers still would prefer orchard trees and tea to pines

	because orchard trees and tea could generate more land value than pine trees. For the benefit of the program, several policy measures are recommended. **Keywords: Economic impacts; Faustmann model; Land expectation value; Slope land conversion program; Land uses**
	Farming miners' or `mining farmers'?: Diamond mining and rural development in post-conflict Sierra Leone/ Roy Maconachie, Tony Binns. Journal of Rural Studies, Volume 23, Issue 3, The Changing Faces of Rural Populations, July 2007, Pages 367-380, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2007.01.003. (http://www.sciencedirect.com/science/article/B6VD9-4N9MYKX-1/2/897339849177f0ee5bc4f3236ae7780e) Abstract: Sierra Leone is currently emerging from a brutal civil war that lasted most of the 1990s, and now has the dubious distinction of being ranked among the world's poorest countries. As thousands of displaced people move back to their villages, a large proportion of the predominantly farm-based rural population are growing food crops for the first time in a decade. Alluvial diamond mining makes an important contribution to the national economy, though some would argue that Sierra Leone's diamonds are a `resource curse'. Drawing upon research undertaken in the 1970s and also in the post-conflict period, the paper provides a longitudinal perspective on the complex links between the farming and mining sectors. Recent field research in Sierra Leone's Eastern Province, indicates that many links between farming and diamond mining have actually been maintained despite severe dislocation. These links could play a key role in rejuvenating market-oriented food production, providing the much-needed impetus for post-war rural development. In charting a future development trajectory, the paper recognizes the urgent need for an effective management scheme for both mining and marketing diamonds, given the potentially destabilizing effect on the country of the uncontrolled exploitation of this valuable resource. In this context, a recent community-based, integrated management initiative adopted by one local NGO, the Peace Diamond Alliance, is examined. If meaningful rural development is to be achieved among desperately poor communities, development strategies must be based on a detailed understanding of the nature of inter-locking livelihoods in the agricultural and mining sectors. **Keywords: Diamonds; Agriculture; Post-conflict; Reconstruction; Sierra Leone; Inter-locking livelihoods**
	Impact of small-holder irrigation on the agricultural production, food supply and economic prosperity of a representative village beside the Senegal River, Mauritania/ David Connor, Jordi Comas, Helena-Gomez Macpherson, Luciano Mateos. **Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 1-15, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.04.001.** (http://www.sciencedirect.com/science/article/B6T3W-4NYJS5K-

	2/2/d7806c0e6ef447dbd30a8d5779dabff6) Abstract: A considerable effort to rehabilitate and extend degraded irrigation schemes is taking place along the Mauritanian side in the Senegal River Valley. To increase understanding of the effects of these activities on the population, a model was used to analyse how the irrigated agriculture production interacts with other production systems, human food supply, and economic prosperity in a representative village in the Middle Valley. The activities in the village comprise grazing of mostly goats and sheep on shrubland, rain fed cropping, partly on saturated soil as river or plain floods recede, and an irrigation area of 32 ha soon to be enlarged to 90 ha. The production environment is characterized by a long dry winter, small, highly variable summer rainfall, and high temperatures and evaporative conditions. River flooding is variable and dependant on rainfall at great distance from the village. Using a generated weather series, the model evaluates the fodder supply for livestock on the shrubland, the productivity of grain and stubble for human and animal consumption, respectively, together with the human labour, and fertilizer and fuel requirements to maintain optional production scenarios. A financial sector calculates cash balance. Established cropping practice uses cowpea, sorghum, millet and rice, the latter on irrigated land. All families have equal access to grazing on the shrubland but different access to rain fed, flood land, and irrigation cropping. The model evaluates the impact of production scenarios on identified family types with distinct resources, extending current practice to a more diverse use of irrigated land by introducing alternative summer (sorghum) and new winter (cowpea) crops. The analysis of the current scenarios reveals the small and variable productivity of the shrubland, the precarious situation facing a family with access to rain-fed cropping only, and the stabilizing, although still inadequate, impact of the initial irrigation project. Expansion of the irrigation area, and more diversified cropping, will provide more families with access to irrigation but the small area available to each family (0.50 ha) will not produce sufficient grain or straw unless cropping is intensified to include a second winter crop. With that, additional benefits will flow indirectly to villagers without access to irrigation, through increased requirement for labour and sale of grain and fodder. The expanded irrigation area increases the stock carrying capacity of the village, raising concerns for the sustainable management of the shrubland. **Keywords: Animal production; Biophysical model; Cropping system; Financial analysis; Grazing; Rural village; Senegal river; Sustainable development**
	Impact of small-holder irrigation on the agricultural production, food supply and economic prosperity of a representative village beside the Senegal River, Mauritania/ David Connor, Jordi Comas, Helena-Gomez Macpherson, Luciano Mateos. **Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 1-15, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.04.001.**

	(http://www.sciencedirect.com/science/article/B6T3W-4NYJS5K-2/2/d7806c0e6ef447dbd30a8d5779dabff6) Abstract: A considerable effort to rehabilitate and extend degraded irrigation schemes is taking place along the Mauritanian side in the Senegal River Valley. To increase understanding of the effects of these activities on the population, a model was used to analyse how the irrigated agriculture production interacts with other production systems, human food supply, and economic prosperity in a representative village in the Middle Valley. The activities in the village comprise grazing of mostly goats and sheep on shrubland, rain fed cropping, partly on saturated soil as river or plain floods recede, and an irrigation area of 32 ha soon to be enlarged to 90 ha. The production environment is characterized by a long dry winter, small, highly variable summer rainfall, and high temperatures and evaporative conditions. River flooding is variable and dependant on rainfall at great distance from the village. Using a generated weather series, the model evaluates the fodder supply for livestock on the shrubland, the productivity of grain and stubble for human and animal consumption, respectively, together with the human labour, and fertilizer and fuel requirements to maintain optional production scenarios. A financial sector calculates cash balance. Established cropping practice uses cowpea, sorghum, millet and rice, the latter on irrigated land. All families have equal access to grazing on the shrubland but different access to rain fed, flood land, and irrigation cropping. The model evaluates the impact of production scenarios on identified family types with distinct resources, extending current practice to a more diverse use of irrigated land by introducing alternative summer (sorghum) and new winter (cowpea) crops. The analysis of the current scenarios reveals the small and variable productivity of the shrubland, the precarious situation facing a family with access to rain-fed cropping only, and the stabilizing, although still inadequate, impact of the initial irrigation project. Expansion of the irrigation area, and more diversified cropping, will provide more families with access to irrigation but the small area available to each family (0.50 ha) will not produce sufficient grain or straw unless cropping is intensified to include a second winter crop. With that, additional benefits will flow indirectly to villagers without access to irrigation, through increased requirement for labour and sale of grain and fodder. The expanded irrigation area increases the stock carrying capacity of the village, raising concerns for the sustainable management of the shrubland. **Keywords: Animal production; Biophysical model; Cropping system; Financial analysis; Grazing; Rural village; Senegal river; Sustainable development**
	Integrating public demands into model-based design for multifunctional agriculture: An application to intensive Dutch dairy landscapes/ Carlos Parra-Lopez, Jeroen C.J. Groot, Carmen Carmona-Torres, Walter A.H. Rossing, *Ecological Economics,* Volume 67, Issue 4, 1 November 2008, Pages 538-551, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.01.007.

	(http://www.sciencedirect.com/science/article/B6VDY-4S035B9-2/2/a131530514c90ce1f4ba043e5614dd82) **Abstract:** The contribution of agriculture to the welfare of society is determined by its economic, social and environmental performance. Although theoretical discussions can be found in the literature, few reports exist that integrate the social demand for multifunctional agriculture in the evaluation of the sustainability and the global welfare of society. This paper presents a methodology that combines economic valuation, integrated modelling, stakeholder analysis, and multi-criteria evaluation. It consists of three steps to determine: (1) social demands for multifunctional agriculture; (2) feasible technical alternatives available from the supply part of the market; (3) the net utility of alternatives for society measured as the change in social net benefit, i.e. the sum of changes compared to the current situation expressed in utility of market and non-market net benefits. Market net benefits are represented by their monetary value. Quality Function Deployment combined with Analytic Network Process (QFD/ANP) were used to estimate the non-market net benefits. The methodology is applied to the case study of a dairy-farming based agricultural landscape in the Northern Friesian Woodlands, The Netherlands. Social net benefit depended on land use, i.e. pasture management regimes on each of the agricultural fields and on presence or absence of hedgerows around the fields. Changes in market net utility were expressed in terms of changes for farmers, consumers and government. Changes in non-market net utility were expressed in terms of changes in landscape quality, nature value and environmental health for Dutch society as a whole, as estimated from European public surveys (Eurobarometer). The complete solution space defined by the market and non-market net benefits of landscapes with alternative patterns of land use was estimated to offer insight in the trade-off between market and non-market performance and enable selection of `icon' landscapes to target or avoid. Improvement of the current landscape towards the social optimum would involve changes in pasture management resulting in higher gross margin for farmers, slightly relaxing current environmental restrictions, which could be reached at lower levels of subsidies in agri-environmental programs. In addition to such overall optimum the results demonstrate the trade-off between market and non-market benefits and the characteristics of current, utopian and dystopian landscapes. The approach provides an alternative to current economic valuation methods which focus on assessment of economic value as an input to analysis. Here, economic value emerges as the trade-off between market and non-market functions which is an output of the analysis. **Keywords: Public preferences; Sustainable agriculture; Multifunctionality; Landscape; Environmental cooperatives; Social net benefit**
	Irrigation in the Jordan Valley: Are water pricing policies overly optimistic?/ Francois Molle, Jean-Philippe Venot, Youssef Hassan. Agricultural Water Management, Volume 95, Issue 4, April 2008,

	Pages 427-438, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.11.005. (http://www.sciencedirect.com/science/article/B6T3X-4RHXWT3-1/2/f6acc0a4d08d7ac17fb58826b7dbe08d) Abstract: Water is very scarce in the Hashemite Kingdom of Jordan. The development of both public irrigation in the Jordan Valley and private groundwater schemes in the highlands has diverted a large share of the country's water resources to agriculture. Many policy instruments have been used in the last 10 years to reallocate water to nonagricultural uses and encourage improvements in efficiency throughout the water sector. Demand management has been emphasized, with water pricing policies expected to instill conservation and motivate a shift toward higher-value crops. We examine the rationale for, and potential and current impact of, pricing policies in the Jordan Valley. We describe the likelihood of success of such policies in terms of operation and maintenance cost recovery, water savings and improved economic efficiency, and we explore some of the alternatives available for meeting these objectives. We show that while operation and maintenance (O&M) costs can be recovered higher water prices have limited potential for achieving gains in irrigation efficiency. The current system of quotas, the lack of storage, and technical difficulties experienced in the pressurized networks indicate that little water can be saved. More substantial increases in water prices can be expected to raise overall economic efficiency by motivating farmers to intensify cultivation, adopt higher-value crops, improve technology, or rent out their land to investors. Yet such strategies are constrained by lack of capital and credit, and pervasive risk, notably regarding marketing. Pricing policies, thus, are best implemented together with positive incentives that reduce capital and risk constraints, and offer attractive cropping alternatives or exit options with compensation. **Keywords: Economic instruments; Demand management; Efficiency; Quotas; Intensification**
	Landowners' perspectives on the rural future and the role of forests across Europe/ Birgit H.M. Elands, Soren Praestholm. **Journal of Rural Studies, Volume 24, Issue 1, January 2008, Pages 72-85, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2007.02.002.** (http://www.sciencedirect.com/science/article/B6VD9-4NF2NGM-1/2/a34f3290b85b5eae3551bfa7f510b2fc) Abstract: Contemporary changes in rural Europe have been characterised by the contrasting terms of rural modernisation and productivism versus restructuring and post-productivism. This study investigates how different categories of owners of farm and/or forestland in 16 case study areas in eight European countries perceive future development. Landowners' prospects for change are investigated on both the locality and enterprise level. Special attention is given to the role of forestry as a potential future development perspective. The results

	reveal that both restructuring and modernisation perspectives are important to many landowners. Moreover, a polarisation seems to be developing between a minority of full-time farmers with progressive farming prospects and the vast majority of landowners with declining prospects or little dependency on primary production. More importantly, the research reveals a third employment perspective, which did not have any specific content apart from the social security of having employment opportunities in the locality. Also at the enterprise level, farmers anticipate both restructuring and modernisation practices, even on the very same property. The study proves that it is not only part-time, hobby and retired farmers that are engaged in 'restructuring' activities, but also full-time farmers. As regards the role of forests, the majority of landowners do not interpret forests in an economic development context, but as green infrastructure important to the local quality of life. It can be concluded that forests are closely related to restructuring thinking among landowners. Future perspectives differ from one European rural area to another, dependent on local conditions and problems. More importantly, however, this research reveals that modernisation-restructuring thoughts and practices of landowners are manifold and heterogeneous in all types of rural areas across Europe. **Keywords: Agriculture; Farming; Forest; Post-productivism; Rural restructuring; Rural development**
	Long-term global availability of food: continued abundance or new scarcity?/ N.B.J. Koning, M.K. Van Ittersum, G.A. Becx, M.A.J.S. Van Boekel, W.A. Brandenburg, J.A. Van Den Broek, J. Goudriaan, G. Van Hofwegen, R.A. Jongeneel, J.B. Schiere, M. Smies. **NJAS - Wageningen Journal of Life Sciences, Volume 55, Issue 3, April 2008, Pages 229-292, ISSN 1573-5214, DOI: 10.1016/S1573-5214(08)80001-2.** (http://www.sciencedirect.com/science/article/B94T2-4WJRNXN-1/2/c71dd2c21d93455d2d9ead995f87f26d) Abstract: During the 20th century hunger has become a problem of poverty amidst plenty rather than absolute food scarcity. The question is whether this will remain so or whether the hunger of the poor will once more be exacerbated by rising food prices. In this paper we discuss biophysical conditions, social forces and non-linear interactions that may critically influence the global availability of food in the long term. Until 2050, the global demand for primary phytomass for food will more than double, while competing claims to natural resources for other purposes (including biobased non-foods] will increase. A sober assessment of the earth's biophysical potential for biomass production, which recognizes competing claims and unavoidable losses, suggests that this is in itself still large enough for accommodating this rising demand. However, the exploitation of this biophysical potential proceeds through technical paradigms that set a relative maximum to food production. In addition, socio-economic mechanisms make the food economy run up against a ceiling even before this maximum is reached. As a consequence, current developments may well entail a new trend change in

	international markets. These developments include the depletion of land and water reserves, the stagnation of the potential yields of major crops, the rise in energy prices, and the way in which systemic socio-economic factors lead to a strong underutilization of production possibilities in the developing world. Given these conditions, the avoidance of steep rises in food prices may depend on the timely relaxation of socio-economic constraints in developing countries and on timely breakthroughs in sustainable yield increases, biorefinement and non-farm production systems. Myopic expectations make it doubtful whether spontaneous market forces will provide the necessary incentives for this, which may be reason for societal actors to consider the need for more active policies. **Keywords: biofuels; biorefinement; competing claims; food markets; food prices; food security; potential production**
	Mitigation strategies for greenhouse gas emissions from agriculture using a regional economic-ecosystem model/ Henry Neufeldt, Michael Schafer, Agriculture, Ecosystems & Environment, Volume 123, Issue 4, February 2008, Pages 305-316, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.07.008. (http://www.sciencedirect.com/science/article/B6T3Y-4PMT5C9-1/2/104704ea59d424f2f7c6b5000e0891cd) **Abstract:** Environmentally effective and economically efficient strategies and measures to reduce GHG emissions from agricultural systems could significantly contribute to GHG emission abatement. As a case study we therefore estimate the possible environmental and economic impacts of different mitigation policies (emission tax, emission cap, nitrogen tax, and livestock extensification) for typical farming systems in the German federal state of Baden-Wurttemberg by coupling an economic farm model with a biophysical model. This allows for an integrated analysis of the complex interactions between socioeconomic and biological systems and provides policymakers with information necessary to take responsible action. For the baseline scenario, average annual GHG emissions in Baden-Wurttemberg are 4.5 Mg CO2-eq ha-1 and range from 1.7 to 7.6 Mg CO2-eq ha-1. On average 38% of the emissions are from N2O (direct and indirect soil emissions, fertilizer production, and manure), 41% are from CH4 (ruminants and manure), and 21% are from CO2 (fertilizer production, gasoline, heating, and additional feed). Analysis of the farming systems shows considerably lower GHG emission from crop-producing farms (2.3-3.6 Mg CO2-eq ha-1) than from livestock-based systems (3.5-7.1 Mg CO2-eq ha-1). For the entire region, GHG emission abatement is 8-12% and income loss ranges from 2 to 10%, depending on the policy instrument. Measures taken to reduce emissions are to decrease mineral N fertilizers and produce crops at lower intensities, to reduce additional feed, and finally to reduce livestock (and concomitantly diminish manure application rates). The extent of abatement and the choice of mitigating measures depend strongly both on the policy instrument

	and on the farming system. Marginal abatement costs (compliance costs plus taxes) are always lowest for the emission cap and highest for the emission tax, with livestock extensification and the nitrogen tax lying in between. Therefore, the emission cap offers the best cost-benefit relation for the farmers but high additional administrative costs, which are not accounted for by the model, must be assumed. The emission tax minimizes compliance costs and should be considered the most efficient instrument at the macroeconomic scale, but again high administration costs must be added. Nitrogen tax and livestock extensification are economically less efficient, but provide greater additional environmental services (e.g. nitrate loading of aquifers, landscape preservation) and produce lower administrative costs, as information on N fertilizers and livestock is readily available from agricultural statistics. **Keywords: Agricultural greenhouse gas emissions; Economic-ecosystem modeling; Greenhouse gas mitigation policies; Farming systems; Emission cap; Nitrogen tax; Livestock extensification; Marginal abatement costs**
	singer, An interdisciplinary model of soybean yield in the Amazon Basin: The climatic, edaphic, and economic determinants/ Maria del Carmen Vera-Diaz, Robert K. Kaufmann, Daniel C. Nepstad, Ecological Economics, Volume 65, Issue 2, 1 April 2008, Pages 420-431, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.07.015. **(http://www.sciencedirect.com/science/article/B6VDY-4PPFTD4-1/2/4166f71c2de1c065f46fa1b667f4aba8)** **Abstract:** Soybean production is one of the main economic forces driving the expansion of the agricultural frontier in the Brazilian Amazon. To assess the potential for expansion we estimate a model of soybean yield that integrates the major climatic, edaphic, and economic determinants in the Amazon Basin. Yield is modeled as a function of yield as simulated by a crop physiology model that captures the effects of climate and physical attributes on the development of soybean plant; fertilizer applications; and economic/spatial parameters such as credit, transports costs and latitude. Current values of these determinants indicate that roughly 20% of Amazon Region or ~ 1,000,000 km2 (excluding protected areas) can generate yields greater than 2000 kg/ha. Soybean production may be possible over a wider area of Amazon, but realizing this potential requires improvements in economic determinants such as the transportation infrastructure. **Keywords: Soybean; Yield model; Amazon Phenology; Agriculture**
	Poverty-Related Factors Associated with Obesity Prevention Policies in Utah Secondary Schools/ Marilyn S. Nanney, Claudia Bohner, Michael Friedrichs. **Journal of the American Dietetic Association, Volume 108, Issue 7, July 2008, Pages 1210-1215, ISSN 0002-8223, DOI: 10.1016/j.jada.2008.04.019.**

	(http://www.sciencedirect.com/science/article/B758G-4SV7KCR-V/2/26d3b3ca8830a06f52f474fe0d612c48) Abstract: To address the childhood obesity epidemic, numerous national agencies have outlined specific school policy recommendations for nutrition and physical activity. The extent to which current policies differ by socioeconomic status and geographic location is yet to be determined. This cross-sectional study examined select school nutrition and physical activity policies by markers for poverty among 209 middle and high schools in Utah (82% response rate). The results show that students' opportunities to establish healthful dietary and physical activity patterns differed by economic circumstances and geographic location. Schools with the highest percentage of free and reduced-price lunch enrollment and schools in rural areas were both less likely to offer a variety of healthful foods outside of the school meal program (ie, competitive foods and drinks) and intramural activities or physical activity clubs. Schools with highest free and reduced-price lunch enrollment were more likely to allow the purchase of unhealthful snacks during lunchtimes than schools with low enrollment (28.4% vs 7.6%, P=0.01). Schools in rural communities were less likely to promote walking and bicycling to school compared with other locations (47.4% rural vs 67.1% urban and 63.6% suburban, P=0.06). Current school policies related to nutrition and physical activity may not be conducive to reducing the childhood overweight problem among children attending schools in areas with increased risk factors due to poverty or rural location in Utah.
	Rural development and the regional state: Denying multifunctional agriculture in the UK/ Terry Marsden, Roberta Sonnino. **Journal of Rural Studies, Volume 24, Issue 4, October 2008, Pages 422-431, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2008.04.001.** (http://www.sciencedirect.com/science/article/B6VD9-4T2RYTM-1/2/a0640b18cb7959adb68a8ef510e300ec) Abstract: Under the emerging rural development paradigm, we argue that to be multifunctional an activity must add income to agriculture, it must contribute to the construction of a new agricultural sector that corresponds to the needs of the wider society and it must reconfigure rural resources in ways that lead to wider rural development benefits. By evaluating UK rural policies on the basis of whether or not they attempt to meet these conditions, this paper shows that an implicit recognition of agriculture's multifunctional character has occurred recently through the shift from a sectoral to a regional and territorial perspective that reintegrates farming into rural development. However, in practice, and especially in England, the UK government has been unable to turn multifunctional activities into a real rural development option. In fact, by continuing to support agri-industrial/retailer interests on the one hand, and post-productivist-- environmental and amenity-- interests on the other, the State is

	governing mostly by setting up competitively organized `projects' and schemes that continue to justify the concentration (and limitation) of resources allocated to agriculture. Based upon a critique of policy developments over the past decade, this paper emphasizes the need for more innovative forms of state innovation that provide opportunities for new, creative and more spatially embedded forms of supply and demand management in agri-food. In the conclusions, the paper also argues that more critical research is needed to uncover the existing and potential role of both governments and producer networks in progressing sustainable rural development through agricultural multifunctionality. **Keywords: Multifunctional agriculture; Rural development; UK rural and agricultural policies; Local food; Rural governance**
	Testing assumptions underlying economic research on transgenic food crops for Third World farmers: Evidence from Cuba/ Daniela Soleri, David A. Cleveland, Garrett Glasgow, Stuart H. Sweeney, Flavio Aragon Cuevas, Mario R. Fuentes, Humberto Rios L., Guatemala and Mexico, Ecological Economics, Volume 67, Issue 4, 1 November 2008, Pages 667-682, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.01.031. (http://www.sciencedirect.com/science/article/B6VDY-4S26K36-2/2/2d99233a57f858cef1f25f887cee26f7) **Abstract:** Transgenic crop varieties (TGVs) are being promoted as essential for improving small-scale Third World (SSTW) agriculture. Most economic research on this topic makes critical, untested assumptions, including that farmers will choose TGVs over other varieties because TGVs are economically optimal and because farmers are risk neutral profit maximizers. We tested these assumptions using data from a survey of 334 farmers in 6 communities in Cuba, Guatemala and Mexico in which farmers ranked 4 real and hypothetical maize varieties for eating and sowing. Our results did not support these assumptions. Most farmers preferred farmer varieties for sowing and especially for eating, avoiding TGVs, a preference associated with being risk averse and with non-monetary preferences. Farmers more integrated into modern agriculture were more likely to choose TGVs. These results suggest that farmers most in need of support and most important for conserving genetic diversity are least favorable toward TGVs, and that alternative ways of improving SSTW agriculture should receive more attention. **Keywords: Transgenic crops; Genetic engineering; Maize; Corn; Third World farmers; Economic assumptions; Risk; Cuba; Guatemala; Mexico**
	Variations in rural development: a comparative analysis of the application of the Rural Development Regulation Framework in France and the Netherlands/ F.-J. Daniel, NJAS - Wageningen Journal of Life Sciences,

	Volume 56, Issues 1-2, October 2008, Pages 7-19, ISSN 1573-5214, DOI: 10.1016/S1573-5214(08)80014-0. (http://www.sciencedirect.com/science/article/B94T2-4WJRNXP-3/2/c06693028bef199c835cba4444ef4a1d) Abstract: This paper reviews the ways in which France and the Netherlands applied the European Rural Development Regulation Framework during the programming period 2000-2006 by examining the two cases and mapping out the main lines of their respective trajectories. It is based on institutional understanding of the policy-making process. The Dutch application was shaped essentially by a nature conservationist view of the countryside, whereas France had a predominantly farmer-oriented implementation. These variations are obviously due to the differences in the national issues at stake, but also to the political clout of the agricultural sector. In the Netherlands, a small and densely populated country in search of space for `nature', farmers have to deal with a rurality made of other claims, whereas in France the farmers have managed to maintain an agricultural countryside. **Keywords: Common Agricultural Policy; multifunctional agriculture**
	Within-field variability of wheat yield and economic implications for spatially variable nutrient management/ M.J. Robertson, G. Lyle, J.W. Bowden, Field Crops Research, Volume 105, Issue 3, 1 February 2008, Pages 211-220, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.10.005. **(http://www.sciencedirect.com/science/article/B6T6M-4R70BRY-1/2/b7ccdd8f009db140e38c19179e7a37df)** **Abstract:** Economic justification for varying fertiliser inputs to match crop yield potential of different areas or zones in fields is limited by lack of understanding of the relationship between the extent of within-field yield variation and economic gains from zone versus uniform management. We conducted a survey of yield monitor data from 199 fields on the northern sandplain of the wheatbelt in Western Australia in order to document the extent of sub-field yield variation and test if variation is related to attributes such as yield and field area. The economic significance to zone management of the yield variation found in the survey along with variation in size of management zones, costs and prices, and soil fertility status was then assessed using a simple nutrient response model. Considerable variation occurred in yield within fields. Standard deviation varied from 0.2 to 1.2 t/ha and the difference in yield between the highest and lowest yielding thirds of each field varied from 0.5 t/ha in the least to 3.3 t/ha in the most variable field. Both small and large (10-172 ha), and low and high (0.6-4.9 t/ha) yielding fields exhibited variation that was potentially worth managing from an economic standpoint. Model results showed that the larger the difference in potential yield between zones, the greater the economic benefit from zone management. While yield contrast within fields can be increased with more zones, the economic advantage of more zones was small for the cases studied

	here. The potential economic benefits (from <$5 to $44/ha) increased with higher grain and fertiliser prices and depended on levels of soil nutrients in the different zones. Capturing the full value of the economic benefits in practice requires an accurate indication of yield potential in the different zones at the time when the fertiliser decision is being made. Yield maps can be utilised by growers to give estimates of within-field variation in yield potential and hence potential economic gains from variable rate application of fertiliser. **Keywords: Precision agriculture; Zone management; Yield potential; Economics; Nutrient requirement; Nitrogen; Phosphorus; Model**

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	Agriculture and land use: Demand for and supply of agricultural commodities/ A. Angus, P.J. Burgess, J. Morris, J. Lingard, characteristics of the farming and food industries, and implications for land use in the UK, Land Use Policy, Volume 26, Supplement 1, Land Use Futures, December 2009, Pages S230-S242, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2009.09.020. (http://www.sciencedirect.com/science/article/B6VB0-4Y3V1JY-J/2/c874799b0f6ad36a083363d2af6984d4) **Abstract:** Agriculture is the largest type of land use in the UK, accounting for about 77 per cent of the total area, compared with an average 50 per cent for the EU27. But in common with most high-income countries, agriculture's contribution to UK GDP and employment is low, at about 0.5 and 1.8 per cent, respectively, although the regional importance of the sector (and its associated food and farming industries) varies considerably. Of the 17.5 million ha used for agriculture, about 28 per cent is allocated to crops, and 67 per cent is grassland. The grassland includes 4.4 million ha of sole-owned rough grazing and 1.1 million ha of common land in mainly upland 'disadvantaged areas,' primarily used for beef and sheep production. This has a major influence on land use, especially in the northern and western parts of the UK. From the 1930s until the mid-1980s, UK policy promoted increases in agricultural productivity to feed the nation from its own resources. An array of income and production support measures encouraged intensive farming, including a relative switch to arable farming in eastern areas. Since the early-1990s, policies have sought simultaneously to make UK agriculture internationally competitive and environmentally benign. These policies, evident in the Agenda 2000 Reforms of the Common Agricultural Policy, point the way forward for the future. It is likely that a greater distinction will emerge between policies to protect natural resources and enhance the flow of non-market ecosystem services from rural land, and agriculture and food policies intended to encourage an appropriate proportion of national food requirements to be met

	from domestic sources. It seems likely that over the next 50 years, the UK's land area will be required to deliver an increasingly diverse range of private and public goods to meet growing human needs and aspirations. This will require a balance of policy-driven goals and market forces. It will also need a much improved understanding of the trade-offs between food production and environmental goals and of the institutional arrangements required to achieve a balance of economic, social and environmental outcomes. **Keywords: Agriculture; Land use; Farm incomes; Food commodity prices; Agri-environment**
	Agroforestry and the search for alternatives to slash-and-burn cultivation: From technological optimism to a political economy of deforestation, Agriculture/ Jacques Pollini. **Ecosystems & Environment, Volume 133, Issues 1-2, September 2009, Pages 48-60, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.05.002.** (http://www.sciencedirect.com/science/article/B6T3Y-4WH6KDT-2/2/cdbad6a6e8aade7890d11e753c3870a3) Abstract: Launched in 1994, the Alternatives to Slash-and-Burn Programme is a multidisciplinary collaborative research effort aimed at addressing the issue of deforestation. This article analyzes the genesis and the history of this research effort and the causes of its successes and failures. I will show that despite the genuine commitment of the ASB Programme to achieve comprehensive analysis linking the social and the biophysical realms, its conclusions and recommendations were biased in favor of biophysical models whose adoption by farmers remained low. The ASB scientists engaged in a self-critique which led to the opening of new areas of inquiry, such as the macroeconomic context of deforestation. But an excessive faith in the positivist paradigm of Western science maintained the illusion that perfect biophysical solutions could be designed, if larger scales (watershed or region) were addressed. Economic instruments (payment for environmental services) are now being elaborated to favor the adoption of these models, and the ASB Programme may be on the verge of replicating at watershed scale the misleading approach it adopted earlier at plot scale. I conclude that in order to properly answer to the environmental challenges of our time, some myths that pervade within the practice of science have to be debunked, and the issue of unequal power between stakeholders have to be addressed. This could be achieved by paying more attention to disciplines that employ the narrative mode to depict realities and by taking more distance from managerial approaches and from the technological optimism that characterizes them. **Keywords: Slash-and-burn cultivation; Agroforestry; Payment for environmental services; Agriculture intensification; Science and technology studies**

	Bringing the real world into economic analyses of land use value: Incorporating spatial complexity/ Ian J. Bateman. **Land Use Policy, Volume 26, Supplement 1, Land Use Futures, December 2009, Pages S30-S42, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2009.09.010.** (http://www.sciencedirect.com/science/article/B6VB0-4Y3V1JY-5/2/799a481c86d79f7b87f0eec06737bd02) Abstract: The paper reviews recent developments in the incorporation of real-world spatial issues into the economic appraisal of land use change. The opening discussion introduces non-economists to the concepts underpinning the approach. The remainder of the paper uses a case study approach (concerning potential conversions from agriculture into multi-purpose woodland) to illustrate the quantification and valuation of land use change. The application of geographical information system (GIS) routines allows spatial complexity to be incorporated within the analysis. Key concepts are introduced such as making allowance for subsidies, the marginal value concept, and the valuation of non-market externalities such as carbon storage of open-access recreation. The case study also shows that, if issues such as spatial variation and externalities are ignored, sole reliance upon market prices can lead to perverse outcomes which are actually to the detriment of society. **Keywords: Modelling; Economics; Space; Geographical information systems (GIS)**
	Development of a mathematical model to study the impacts of production and management policies on the herd dynamics and profitability of dairy goats/ Vinicius Pereira Guimaraes, Luis Orlindo Tedeschi, Marcelo Teixeira Rodrigues. **Agricultural Systems, Volume 101, Issue 3, July 2009, Pages 186-196, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.05.007.** (http://www.sciencedirect.com/science/article/B6T3W-4WM68K8-2/2/53942ebfaff3348a58dbfbdbff9323df) Abstract: The reduction in goat milk production and the competitiveness of more profitable activities have increased the adoption of measures to enhance goat milk and meat around the world. A simulation model was built to evaluate the dynamics of a dairy goat herd under different scenarios of production. A System Dynamics approach was used to identify management policies that could affect the behaviour of the herd over 10 years of simulation using data from a dairy goat herd in Brazil. The impact of reproductive and mortality rates, one or two annual reproductive cycles on production, and economic health of dairy goats on changes in the herd dynamics were evaluated. Simulations indicated that small changes in reproduction and mortality rates and milk price can considerably affect the dynamics of the herd as well as the financial health of the production

	system. The interferences created to visualize the effects were not immediately realized because of intrinsic delays in the system. The comparison of models with one or two breeding seasons indicated that the latter was considerably more profitable and had a faster turnover. It was also found that the two breeding season had a greater capacity to support reduction in milk price that could generate financial instability in the production system. It was concluded that mathematical models can be used to predict impacts in management policies on herd dynamics and sensitivity to support the dairy goat activity showing its viability as an agricultural activity that can contribute to the production and incomes in small farms. **Keywords: Herd dynamics; Mathematical model; Dairy goats; Simulation**
	Economic return of purple and yellow nutsedge management in vegetable production of southern California/ G. Wang, M.E. McGiffen Jr., E.J. Ogbuchiekwe, L. Butler, ***Crop Protection*, Volume 28, Issue 4, April 2009, Pages 319-326, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.11.011.** (http://www.sciencedirect.com/science/article/B6T5T-4V64YHC-1/2/daad26289abd53200c6c4810557da85e) Abstract: The economic return of a standard low desert crop rotation of spring cantaloupe (Cucumis melo L.)-summer fallow-winter broccoli (Brassica oleracea L.) infested with purple nutsedge (Cyperus rotundus L.) or yellow nutsedge (Cyperus esculentus L.) was compared to alternative rotations that included: cultivation (hand-hoeing), a smother crop of wheat (Triticum aestivum L.) and sudangrass (Sorghum sudanense L.), a smother crop of wheat followed by solarization, and sweet corn (Zea mays L.) with halosulfuron application followed by sudangrass in southern California from 2001 to 2003. After two growing seasons, broccoli was planted without any nutsedge control. Purple and yellow nutsedge tubers increased dramatically in the untreated plots and purple nutsedge reduced crop yield and economic returns. Solarization was the most effective treatment for reducing purple nutsedge populations, but had a negative economic return above variable costs. Multiple hand-hoeing also controlled purple nutsedge effectively and resulted in a net return of $3069/ha. The halosulfuron and the smother crop treatments did not control purple nutsedge and had negative economic returns. Yellow nutsedge did not affect crop yield significantly during the course of the experiment. All methods controlled yellow nutsedge effectively, especially when there were no crops growing in the summer. However, the economic return of the treatments varied significantly. The net return of the cultivation treatment in the yellow nutsedge field was $9219/ha, while the net returns of the halosulfuron and smother crop treatments were negative. When the final broccoli crop was grown without nutsedge control from October 2003 to January 2004, solarization was the only treatment to be profitable in the purple nutsedge field. The cultivation and the solarization treatments had the highest economic return in the yellow nutsedge field, while

	the only treatment with negative economic return in the yellow nutsedge field was the smother crop treatment. For both purple and yellow nutsedge, planting sudangrass in the summer had the lowest broccoli yield and economic return. **Keywords: Cost-benefit analysis; Crop rotation; Sustainable agriculture**
	Economic valuation of the vulnerability of world agriculture confronted with pollinator decline/ Nicola Gallai, Jean-Michel Salles, Josef Settele, Bernard E. Vaissiere, Ecological Economics, Volume 68, Issue 3, 15 January 2009, Pages 810-821, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.06.014. **(http://www.sciencedirect.com/science/article/B6VDY-4T4J0BG-1/2/e7540e4db8045590771506f5b4fd150c)** **Abstract:** There is mounting evidence of pollinator decline all over the world and consequences in many agricultural areas could be significant. We assessed these consequences by measuring 1) the contribution of insect pollination to the world agricultural output economic value, and 2) the vulnerability of world agriculture in the face of pollinator decline. We used a bioeconomic approach, which integrated the production dependence ratio on pollinators, for the 100 crops used directly for human food worldwide as listed by FAO. The total economic value of pollination worldwide amounted to [euro]153 billion, which represented 9.5% of the value of the world agricultural production used for human food in 2005. In terms of welfare, the consumer surplus loss was estimated between [euro]190 and [euro]310 billion based upon average price elasticities of - 1.5 to - 0.8, respectively. Vegetables and fruits were the leading crop categories in value of insect pollination with about [euro]50 billion each, followed by edible oil crops, stimulants, nuts and spices. The production value of a ton of the crop categories that do not depend on insect pollination averaged [euro]151 while that of those that are pollinator-dependent averaged [euro]761. The vulnerability ratio was calculated for each crop category at the regional and world scales as the ratio between the economic value of pollination and the current total crop value. This ratio varied considerably among crop categories and there was a positive correlation between the rate of vulnerability to pollinators decline of a crop category and its value per production unit. Looking at the capacity to nourish the world population after pollinator loss, the production of 3 crop categories - namely fruits, vegetables, and stimulants - will clearly be below the current consumption level at the world scale and even more so for certain regions like Europe. Yet, although our valuation clearly demonstrates the economic importance of insect pollinators, it cannot be considered as a scenario since it does not take into account the strategic responses of the markets. **Keywords: Pollination; Valuation; Vulnerability; Agriculture; Ecosystem service; Crop**
	Exergetic assessment for ecological economic system: Chinese agriculture/ G.Q. Chen, M.M. Jiang, Z.F. Yang, B. Chen, Xi Ji, J.B. Zhou, Ecological Modelling, Volume 220, Issue 3, 10 February 2009, Pages 397-410, ISSN

	0304-3800, DOI: 10.1016/j.ecolmodel.2008.10.006. (http://www.sciencedirect.com/science/article/B6VBS-4V1MB28-2/2/445d38e526aab557a1ab6b25ec5e084e) **Abstract:** Based on the thermodynamic concept of exergy as a unified measure for environmental resources and economic products, a framework for systems assessment is presented for ecological economies. With a typical systems diagram devised for a general ecological economy with four arm fluxes for free local natural resources, purchased economic investment, environmental impact and economic yield, system indices of the renewability index, exergy yield ratio, exergy investment ratio, environmental resource to yield ratio, system transformity and environmental stress index are defined for a congregated systems ecological assessment with essential implications to sustainability. As a detailed case study to the Chinese agriculture from 1980 to 2000 with cropping, forestry, stockbreeding and fishery sectors, extensive exergy account and systems assessment are carried out with emphasis on annual and structural variations against social political transitions. For the overall agriculture as a congregated ecological stage, the value of the system transformity is found around 10, the typical value for the general ecological hierarchy as well devised by Odum associated with Lindeman's Tenth Law. **Keywords: Exergy; Environmental resources; Agriculture; Ecological economy**
	Family farmers and major retail chains in the Brazilian organic sector: Assessing new development pathways. A case study in a peri-urban district of Sao Paulo/ Julien Blanc. Journal of Rural Studies, Volume 25, Issue 3, July 2009, Pages 322-332, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2009.01.002. (http://www.sciencedirect.com/science/article/B6VD9-4VPV8PP-1/2/a1bd0eef2449c1424e7c1ef945754117) Abstract: The expansion of the organic sector in Brazil is seen as a leverage for the social emancipation of the small family farmers. Next to the traditional alternatives circuits of organic food and farming, new powerful capitalistic actors, such as supermarket chains, are rapidly entering the Brazilian organic arena. Can family farming benefit from the development of these 'conventional' commercialisation circuits in the organic sector? Research undertaken in 2007, in a green belt rural community of Sao Paulo, shows how family farmers may have benefited from the implication of large retail chains in the organic sector and how an economically and ecologically outstanding agriculture may arise from these circumstances. However, we highlight the crucial role played by social regulation: only strong solidarity between farmers and the implication of technicians, militants and researchers in the process made it possible to counter the negative effects of the liberal logic governing the development of organic

	farming via the major retailers. Still, as tougher competition is expected on the regional organic market, the development of short supply chains involving 'committed' consumers and the broader integration of the local farmers in networks of organic militancy appear crucial. It would guarantee a continuous enhancement of the local human and social capital, reinforce an emerging process of internal conversion and allow for a stronger social regulation of the future local development pattern. **Keywords: Family farming; Supermarkets chains; Organic horticulture; Agro-ecology; Social development; Peri-urban; Sao Paulo (Brazil)**
	Farmers' welfare, food production and the environment: a model-based assessment of the effects of new technologies in the northern Philippines/ A.G. Laborte, R.A. Schipper, M.K. Van Ittersum, M.M. Van Den Berg, H. Van Keulen, A.G. Prins, M. Hossain. **NJAS - Wageningen Journal of Life Sciences, Volume 56, Issue 4, June 2009, Pages 345-373, ISSN 1573-5214, DOI: 10.1016/S1573-5214(09)80004-3.** (http://www.sciencedirect.com/science/article/B94T2-4X7YKRJ-4/2/292bb6e7bef7d69b439c29618fb430ce) Abstract: Policy objectives of attaining food self-sufficiency and improving the well-being of subsistence farmers while protecting the environment have stimulated the development of many improved agricultural production technologies. With a choice of technologies, farm household decisions are governed not only by productivity and profitability considerations but also by factors such as available resources and their quality, family consumption preferences and attitudes towards risks, and prevailing policies. It is therefore necessary to analyse the adoption of such technologies from a whole-farm perspective. In this paper, a farm household model is used to assess possible technology adoption behaviour of farmers in Ilocos Norte Province, Philippines. Four alternative technologies were evaluated: hybrid rice production (HYR), balanced fertilization strategy (BFS), site-specific nutrient management (SSNM) and integrated pest management (IPM). Possible impacts of price policies and infrastructure improvements on technology adoption were assessed. The results show that all four alternative technologies considered are attractive to farmers, although simulations show differential adoption rates for poor, average and better-off households. IPM and HYR appear the most attractive amongst all technologies considered. In all technology simulations, relative profitability and risks, labour and capital requirements and availabilities are decisive factors in the adoption of alternative technologies. Adoption of alternative technologies would result in higher discretionary income, higher rice production and lower biocide use and nitrogen loss. Amongst policy simulations considered, availability of low-cost credit shows the largest improvements in farmer welfare for poor and average households, but its effect on simulated adoption of alternative technologies was variable. We argue that the methodology and results presented can contribute to ex ante assessments of policies targeted at stimulating technology adoption by

	farmers. **Keywords: farm household modelling; hybrid rice; IPM; nutrient management; Philippines; rice-based cropping systems**
	Land suitability, water balance and agricultural technology as a Geographic-Technological Index to support regional planning and economic studies/ Mauricio P.F. Fontes, Rosa M.O. Fontes, Patricio A.S. Carneiro. Land Use Policy, Volume 26, Issue 3, July 2009, Pages 589-598, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2008.08.010. (http://www.sciencedirect.com/science/article/B6VB0-4TPND5Y-1/2/7e73a1478f5196abc9520f175ec5318f) Abstract: Land suitability, water balance and agricultural technological inputs are important characteristics of the soil as a natural resource and can play a significant role in the agricultural production and productivity. Based on these characteristics, a Geographic and Technological Index, the GeoTec Index, is proposed in order to help detecting regional agricultural income inequalities and also to be used as a geographic variable in economic studies. The GeoTec Index is built as a weighted average of three sub indices, namely, Land Suitability, Hydrological and Technological Indices. The Land Suitability Index is based on the agricultural suitability or the aptitude of a given land to support a defined agricultural use. The Hydrological Index (HyI) is based on a water balance which determines the potential and actual amounts of evapotranspiration and water surplus, or excess of precipitation over evapotranspiration, and corresponds to a number that represents either the annual soil water excesses or deficits. And the Technological Index is the sum of several sub indices, based on technological inputs used in the agriculture, such as soil conservation practices, farmer's technical assistance, use of soil fertilizers and correctives, presence of electric power, use of pest and disease control and use of irrigation. The Geographic and Technological Index (GeoTec) is a combination of the Land Suitability, Hydrological and Technological Indices and it is calculated with data from Minas Gerais State, Brazil, for the period of 1990-2001. The criterion for the regional subdivision of Minas Gerais State was the one proposed by the Brazilian Institute of Geography and Statistics (IBGE), which divides the state into 66 micro regions. The highest values of GeoTec Index are obtained at micro regions of the most developed part of the state, whereas the lowest values of the GeoTec Index are found in micro regions located in the poorest part of Minas Gerais State. There was a strong and positive relationship between the GeoTec Index and the productivity of grains and, at the same time, there is a strong negative relationship between the GeoTec Index and the percentage of poor people in Minas Gerais State micro regions. The GeoTec Index can be a powerful instrument for detecting regional inequalities and to implement public policies as an attempt to decrease the agricultural income disparities among regions. **Keywords: Soil agricultural suitability; Hydrologic conditions; Agricultural**

	technological inputs; Geographic variables
	Luca Bechini, Nicola Castoldi, On-farm monitoring of economic and environmental performances of cropping systems: Results of a 2-year study at the field scale in northern Italy, Ecological Indicators, Volume 9, Issue 6, November 2009, Pages 1096-1113, ISSN 1470-160X, DOI: 10.1016/j.ecolind.2008.12.008. (http://www.sciencedirect.com/science/article/B6W87-4VH8Y57-2/2/eeb010376d95f56e7c91657a36f53a6e) **Abstract:** Cropping systems in northern Italy are intensively managed, but an integrated environmental accounting of these systems has not been published yet. We conducted this study to evaluate cropping systems management in a study area in northern Italy using indicators. The study area is a regional agricultural Park, with cereal and livestock farms, cultivating mostly maize, rice, meadows, and winter cereals. To select the indicators, we identified for the study area the most relevant issues concerning the potential impact of agriculture on the environment: nutrient and pesticide management, use of fossil energy and soil management. Subsequently, we selected indicators from the literature, which could address these issues. We also added indicators describing the economic performance. The data were collected at the field level by periodic face-to-face interviews with seven farm managers over 2 years. Indicators were calculated for all crops cultivated in each field (n = 266). According to the methodology proposed, the best economic performance (gross margin) was obtained by rice, followed by maize, winter cereals, and forage crops. Nitrogen and phosphorus surpluses were high for maize (due to a large use of animal manures), and moderate for rice and permanent meadows (where mineral fertilisers are not usually applied). Maize used high fossil energy inputs; however, the output/input ratio (an indicator of the dependence of food and feed production on non-renewable energy) was elevated, due to high aboveground biomass production. The potential impact due to pesticide use (evaluated with indicators that consider the toxicity and the exposure to active ingredients) was relevant only for rice, moderate for maize and other cereals, and null for forages. Finally, soil management was evaluated for the 2-year crop succession on each field (n = 131): permanent meadows are excellent (due to continuous soil cover and large returns of organic carbon to soil), rice-based successions are unsatisfactory (due to low residues and manure application and continuous cropping), and maize successions are intermediate. This work shows that good quality data can be collected on-farm for economic and environmental accounting at field level. The indicators chosen for the analysis describe a range of issues in the study area, and make it possible to clearly separate and characterise different cropping systems. The procedure for their calculation is transparent and sound, and can be applied for ex-ante, ex-post, and monitoring procedures.

	Keywords: Assessment; Economic costs; Energy; Nitrogen; Environmental accounting; Pesticides; Phosphorus; Soil organic matter
	Off-farm labour decision of Canadian farm operators: Urbanization effects and rural labour market linkages/ Alessandro Alasia, Alfons Weersink, Ray D. Bollman, John Cranfield. **Journal of Rural Studies, Volume 25, Issue 1, January 2009, Pages 12-24, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2008.04.002.** (http://www.sciencedirect.com/science/article/B6VD9-4SJR2D9-2/2/7b14b5d18922e45ab83e7ab7df0f7b86) Abstract: Understanding the factors affecting off-farm labour decisions of census-farm operators has significant implications for rural development and farm income support policy. We examine the off-farm labour decisions of Canadian farm operators using micro-level data from the 2001 Census of Agriculture combined with community level data from the 2001 Census of Population. While confirming some of the findings of previous research with respect to the effects of human capital and farm characteristics on off-farm work participation, this study shows the differential impact of those variables for operators of smaller and larger holdings. Family, community and regional characteristics appear more relevant in determining the joint decision to work off-farm and operate a smaller holding, compared to the decision to work off-farm and operate a larger farm. Results suggest that, once other factors are accounted for, proximity to urban centres does not have a positive effect on the joint decisions to participate in off-farm work and to operate a holding. This joint decision, in fact, is more related to the dynamics of the local labour market. A major implication of these findings is that while urban centers might represent an engine of growth for overall rural income through employment opportunities for the non-farm workforce, the non-farm income of farm operators is more likely to be affected by policy initiatives that address directly the dynamics of labour markets in the community where the operator lives. **Keywords: Off-farm labour; Labour markets; Rural development**
	Saving threatened native breeds by autonomous production, involvement of farmers organization, research and policy makers: The case of the Sicilo-Sarde breed in Tunisia, North Africa/ M. Djemali, S. Bedhiaf-Romdhani, L. Iniguez, I. Inounou. **Livestock Science, Volume 120, Issue 3, Special Issue: Animal Genetic Resources, February 2009, Pages 213-217, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.07.011.** (http://www.sciencedirect.com/science/article/B7XNX-4T6KFKS-2/2/ff6691b8b25b59322e78081bc68f53f4) Abstract: The Sicilo-Sarde, the only native milking sheep in Tunisia and in North Africa

	has undergone a considerably population reduction from 200,000 ewes in 1995 to 25,000 ewes in the year 2000. Low sheep milk price and a shift to dairy cattle were among the reasons for this decline. The main objective of this study was to report on the impact of farmers organization, technology transfer and market on reversing the dramatic decline of this native dairy sheep breed to a promising livestock development model. Having at the grassroots a 'pioneer' who chose to form the Sicilo-Sarde breed association in 2003 was a key ingredient in the process of saving this breed from disappearance. Quick steps were first taken: Selling milk through the association allowed doubling its price in one year. A new legislation benefiting dairy sheep was introduced. A trilogy principle was followed where breed owners, researchers and policy makers interacted together to find optimum solutions that fit expressed needs of breed owners. An applied multidisciplinary research program was established and tackled major constraints faced by the breed in nutrition, management, reproduction, health, breeding and product development. Encouraged by an unsatisfied market and good prices, small farmers with a few cows started shifting to dairy sheep and poor new ones managed to get loans to purchase dairy sheep breeding animals. Based on a total of 7937 lactations recorded during the period 1997-2002, average milk yield, days in milk and suckling period were 89 kg +/- 47 kg, 139 d +/- 47 d and 104 d +/- 22 d, respectively. Given the low producing ability of the breed and the impossibility of importing proven rams for health considerations, frozen semen from 17 Sarda rams was imported from Italy and 1600 ewes from 12 flocks were inseminated by intrauterine in 2005-2006. Fertility, prolificacy, and mortality rates varied from 47% to 63%, 157% to 184% and 0 to 34%, respectively. The decline of the breed was stopped and reversed and members of the association and small farmers in the region will benefit from the produced offspring. While currently the association is accessed by more organized producers, it provides an opportunity for the integration of smaller, poorer producers to improve their livelihoods. This case has inspired another group of farmers of a native sheep meat breed to form their own association to promote their breed. **Keywords: Sheep; Dairy; Sicilo-Sarde; Insemination; Fertility; Association**
	The early economic impact of a nutrient management decision support system (NuMaSS) on small farm households cultivating maize on acidic, upland soils in the Philippines/ T. Walker, J. Friday, M. Casimero, R. Dollentas, A. Mataia, R. Acda, R. Yost. **Agricultural Systems, Volume 101, Issue 3, July 2009, Pages 162-172, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.05.004.** (http://www.sciencedirect.com/science/article/B6T3W-4WH6KSN-1/2/5dc4ac2e0d0c991e094eadde942aab4c) Abstract: Maize is the most important crop in upland areas in the Philippines, but production lags behind potential in many areas, especially those with acid soils. The Nutrient Management Support System (NuMaSS), a computer-based decision aid, provides soil and crop-based recommendations for nutrient

	amendments and lime. Development and trials of the NuMaSS were carried out on upland maize farms in Isabela province in the northern Philippines from 1998 to 2006. While local practices and standardized government recommendations had included applying N, P, and K, the application of lime to correct soil acidity had not been practiced locally and lime was not commercially available in local markets. Based on data from 39 field trials on 13 different farms over four years, we calculate that liming increased maize grain yield on the average by 1.5 t/ha. A farmer purchasing and applying lime would realize a single-season marginal rate of return on investment of about 160%. Because of the positive results of the on-farm trials of the NuMaSS, and in particular the positive result of liming acid soils, the Philippine Department of Agriculture began a lime promotion program in four provinces in Region II in 2006. The program includes field days, farm-level demonstrations, and distribution of subsidized lime to farmer-cooperators. We estimate the economic value of the NuMaSS and lime promotion program to have an NPV of $8 million or an IRR of 25%. We base our calculations on the costs for the research program itself, the costs of the extension program, the costs of the subsidized inputs for the first four years, and the benefits of improved maize production over a 40 year horizon over 12,000 ha (out of a potential 90,000 ha of acid soils in maize production). Our calculations show that the NPV of the lime promotion increases with increasing adoption but the program has a positive NPV even if adoption is negligible after the initial promotional program ceases. Our results document the adoption and farm level and regional economic impact of a decision aid. As agriculture in the Philippines and other developing countries expands with increasing food prices and other demands such as bioenergy production, farmers will need better decision tools such as the NuMaSS to manage crop production on problem soils and marginal sites. **Keywords: Decision aid; Extension; Adoption; Lime**
	The economic impacts of drought on the economy of Iran: An integration of linear programming and macroeconometric modelling approaches/ Habibollah Salami, Naser Shahnooshi, Kenneth J. Thomson, Ecological Economics, Volume 68, Issue 4, Participation and Evaluation for Sustainable River Basin Governance, 15 February 2009, Pages 1032-1039, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.12.003. **(http://www.sciencedirect.com/science/article/B6VDY-4VFBX4B-1/2/b3daf34449e3d8c79c2f4d80dda0aadc)** **Abstract:** In this paper, we provide economy-wide estimates of the costs of drought in the cropping sector of the Iranian economy, using a linear programming model to estimate the direct costs on agriculture, and a macroeconometric model to trace the indirect impacts on the rest of the economy. The results indicate that a severe drought such as the one that occurred in the crop year 1999-2000 imposes a direct cost of 1605 million USD, equivalent to 30.3% of the total value added of the cropping sector in Iran. This, in turn, leads to a 12.7% reduction in the value added of other agricultural sub-sectors (livestock, fisheries and forestry). In the

	rest of the economy, the manufacturing and service sectors experience value added declines of 7.8 and 3.7%, respectively. In addition, there is a substantial decrease in investment in the agricultural, manufacturing and service sectors. Thus, such a drought reduces overall GDP by about 4.4%, and it would also result in decreased non-oil exports, increased food imports, and a rise in inflation. The results of some drought mitigation simulations are reported in brief. Such estimates strengthen the case for increased attention to drought strategies and management in agriculture in Iran and elsewhere. **Keywords: Iran; Drought; Agriculture; Macroeconometric modeling; Linear programming**
	The projected costs and benefits of water diversion from and to the Sultan Marshes (Turkey)/ Filiz Dadaser-Celik, Jay S. Coggins, Patrick L. Brezonik, Heinz G. Stefan. Ecological Economics, Volume 68, Issue 5, 15 March 2009, Pages 1496-1506, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.10.012. (http://www.sciencedirect.com/science/article/B6VDY-4V0V113-1/2/51f4f37623bc9c113320a9c94b609b54) Abstract: The Sultan Marshes in the Develi Basin, Anatolia, one of twelve internationally important wetlands of Turkey, have been severely affected by the construction of an irrigation project in 1988. Intensive use of surface and ground water in irrigation has caused more than a 1 m decline in water levels and has affected the wetlands' ecological characteristics. Previous studies indicate that Sultan Marshes will need more water to restore viable ecological conditions. In this study, we analyze how economic benefits from agriculture and wetlands would be affected if moderate amounts of water were diverted from agriculture back to wetlands in the Develi Basin. By estimating total and marginal costs and benefits associated with water diversions, we determined the optimum or economically-efficient amount of water diversion. When only direct-use values of the wetland (animal grazing, plant harvesting, and ecotourism) were included in the analysis, the optimum amount of water diversion to the wetlands was found to be 5.2 million m3 year- 1 (165 L sec- 1), which compares to about 62 million m3 year-1 (1,957 L sec- 1) used in irrigation. When wastewater treatment benefits (an indirect-use value) were added, the optimum amount rose to 7 million m3 year-1. Overall, the analysis showed that water diversion from agriculture to the Sultan Marshes is economically preferable. **Keywords: Agriculture; Economics; Sultan Marshes; Turkey; Water diversion; Wetlands**
	Translation sociology and social capital in rural development initiatives. A case study from the Italian Alps/ Natalia Magnani, Lauro Struffi. Journal of Rural Studies, Volume 25, Issue 2, April 2009, Pages 231-238, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2008.10.004. (http://www.sciencedirect.com/science/article/B6VD9-4V1V4SK-1/2/980cc33dc0998135a2281550aaaef878)

Abstract:
This article analyses the results of a European `research and demonstration' project promoting multifunctional and sustainable agriculture in Alpine regions through a participatory approach. It focuses in particular on initiatives undertaken by a local farmers group in the Italian Alpine area of Val di Sole, the purpose being to draw attention to the role of social dynamics in fostering sustainable rural development in a participatory context. In order to accomplish this objective, two key sociological approaches to the study of rural development, namely social capital and the sociology of translation, are considered. The former focuses on the relational capital available to a group of actors and which can be mobilised in a development initiative. The latter views change in social practices as resulting from a cycle of phases where the problem, its solution, and the identity of the actors are constantly transformed and negotiated. By contrasting the two theoretical approaches in relation to the outcomes of two specific actions implemented in the valley we suggest that the sociology of translation offers a more effective tool with which to capture the complexity of social dynamics involved in a rural development initiative.
Keywords: Social capital; Sociology of translation; Rural development; Mountain agriculture; Italy

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Agricultural multifunctionality and farmers' entrepreneurial skills: A study of Tuscan and Welsh farmers/ Selyf Lloyd Morgan, Terry Marsden, Mara Miele, Adrian Morley. Journal of Rural Studies, Volume 26, Issue 2, April 2010, Pages 116-129, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2009.09.002. (http://www.sciencedirect.com/science/article/B6VD9-4XFNCSC-1/2/7932cadf9e559e51c2a50ca0c3fa9f4c)

Abstract:
The process of agricultural restructuring in Europe has been strongly influenced both by CAP support of multifunctional agriculture and by market liberalisation, and farmers are exhorted to become more entrepreneurial in response. This paper explores the interaction of these policy goals in two regions where a rural development form of multifunctionality is favoured.
Farmers' entrepreneurial skills are used as an organising framework, and relate farm development to both farm and farmer-specific factors as well as to their institutional, cultural, social and economic contexts. The study of entrepreneurial skills is related to how multifunctional agriculture is expressed at farm-level and how farm businesses may respond to rural development initiatives. The framework highlights dynamic and highly contingent responses and brings the roles, identities and the framing of farmers into focus, offering a means by which farmer advice and support may be tailored to farmer circumstances.
Keywords: Multifunctional agriculture; Rural development; Entrepreneurial skills

	An economic assessment of the value of tropical river ecosystem services: Heterogeneous preferences among Aboriginal and non-Aboriginal Australians/ Kerstin K. Zander, Anna Straton. **Ecological Economics, Volume 69, Issue 12, 15 October 2010, Pages 2417-2426, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2010.07.010.** (http://www.sciencedirect.com/science/article/B6VDY-50N2VF1-2/2/9a501eb44c9bbbbb4ab27396e37d42ea) Abstract: There is a current debate about development of the river and wetland systems of tropical Australia. Aboriginal and non-Aboriginal residents of tropical river catchment areas have complex values for these systems which are difficult for decision-makers to accommodate. Aboriginal Australians are a large and growing proportion of the population and are also significant landowners, yet there is little information about the impacts of potential development scenarios on the welfare of Aboriginal Australians that can be used in benefit-cost analyses. This paper reports the application of a choice experiment to assess the potential impact of development/management strategies for three tropical rivers in Australia, and explores the differences between the preferences of Aboriginal and non-Aboriginal Australians living in the catchment areas. Most respondents preferred healthy river systems that are managed under conservation schemes even if this comes at a private cost. The willingness-to-pay of Aboriginal Australians was significantly higher than that of non-Aboriginal Australians for some river attributes, particularly those related to cultural values. Aboriginal respondents were also indifferent towards the extraction of water for irrigated agriculture while non-Aboriginal respondents preferred moderate rather than large or small scale use. **Keywords: Choice experiment; Cultural values; River catchments; Stated preference; Welfare estimates**
	Balancing the use of wetlands for economic well-being and ecological security: The case of the Limpopo wetland in southern Africa/ Wellington Jogo, Rashid Hassan, Ecological Economics, Volume 69, Issue 7, Special Section: Ecosystem Services Valuation in China, 15 May 2010, Pages 1569-1579, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2010.02.021. **(http://www.sciencedirect.com/science/article/B6VDY-4YTST8C-5/2/9429082935d74d8356997f89429ff7f9)** **Abstract:** Wetlands in southern Africa continue to be degraded and lost through conversion to agriculture and other uses. One of the major constraints to sustainable management of wetlands in the region is that wetland users and decision-makers have insufficient understanding of the consequences of alternative management and policy regimes on wetland functioning, ecosystem services and human well-being. This study developed an ecological-economic model based on the system

	dynamics framework to simulate the impacts of alternative policy regimes on wetland functioning and economic well-being. Results showed that wetland services (crop production and natural resource harvesting) are inter-linked with trade-offs involved through their competition for labour, land and water resources. Policy scenario simulation results showed that diversifying livelihoods out of agriculture simultaneously improves economic well-being and enhances wetland conservation. Pure conservation strategies impose significant losses in the economic welfare of local population unless supported with diversification of livelihood sources. Government policies that support livelihood diversification into off-farm livelihood opportunities for the rural poor are critical for sustainable wetland management. **Keywords: Wetlands; Southern Africa; Ecological-economic model; Economic well-being**
	Economic assessment of food safety standards: Costs and benefits of alternative approaches/ W. Bruce Traill, Ariane Koenig, *Food Control*, Volume 21, Issue 12, SAFE FOODS - Towards a new risk analysis framework for food safety, December 2010, Pages 1611-1619, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.06.018. **(http://www.sciencedirect.com/science/article/B6T6S-4WMDHGK-4/2/40deaecc17d2856d1fca816cca7c7e45)** **Abstract:** This article provides an overview of economic methods to measure costs and benefits related to food safety issues. After an introduction on general economic principles, including the distinction between social and private costs and benefits, the article highlights the various methods for calculation of costs and benefits, including 'willingness to pay', amongst others. Particular attention is paid to the 'quality-adjusted life years' (QALY) method for quantitatively expressing health impacts. The practice of Regulatory Impact Assessments as carried out by the UK authorities is explored in more detail as an example of cost-benefit analysis of regulatory measures. The applicability of the approaches to the various stages of the SAFE FOODS model is highlighted. **Keywords: Food safety economics; Impact assessment; Cost-benefit; QALY**
	Food consumption patterns and economic growth. Increasing affluence and the use of natural resources/ P.W. Gerbens-Leenes, S. Nonhebel, M.S. Krol, Appetite, Volume 55, Issue 3, December 2010, Pages 597-608, ISSN 0195-6663, DOI: 10.1016/j.appet.2010.09.013. **(http://www.sciencedirect.com/science/article/B6WB2-5120JXC-1/2/052ddb3373684937183826e16d49c67b)** **Abstract:** This study analyzes relationships between food supply, consumption and income, taking supply, meat and dairy, and consumption composition (in macronutrients) as indicators, with annual per capita GDP as indicator for

	income. It compares food consumption patterns for 57 countries (2001) and gives time trends for western and southern Europe. Cross-sectional and time series relationships show similar patterns of change. For low income countries, GDP increase is accompanied by changes towards food consumption patterns with large gaps between supply and actual consumption. Total supply differs by a factor of two between low and high income countries. People in low income countries derive nutritional energy mainly from carbohydrates; the contribution of fats is small, that of protein the same as for high income countries and that of meat and dairy negligible. People in high income countries derive nutritional energy mainly from carbohydrates and fat, with substantial contribution of meat and dairy. Whenever and wherever economic growth occurs, food consumption shows similar change in direction. The European nutrition transition happened gradually, enabling agriculture and trade to keep pace with demand growth. Continuation of present economic trends might cause significant pressure on natural resources, because changes in food demand occur much faster than in the past, especially in Asia. **Keywords: Dietary change; Economic development; Natural resource use; Nutrition transition; Food consumption patterns**
	Is an integrated farm more resilient against climate change? A micro-econometric analysis of portfolio diversification in African agriculture/ S. Niggol Seo **Food Policy, Volume 35, Issue 1, February 2010, Pages 32-40, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2009.06.004**. (http://www.sciencedirect.com/science/article/B6VCB-4WTYY2G-1/2/cc13c8ca6d105fae1f1a69ccef5d4707) Abstract: This paper examines whether an integrated farm that owns both crops and livestock is more resilient under global warming than a specialized farm in crops. Using around 9000 farm surveys across Africa, we explore how farmers choose one of the farm types and how the net revenue of each type varies across the range of climate in Africa. The results indicate that an integrated farm increases in number while a specialized farm decreases across Africa under climate predictions for 2060. The relative profitability of each system against each other also changes. An integrated farm becomes relatively more profitable over specialized farms half a century from now. The impacts of climate change on integrated farms range from 9% loss to 27% gain depending on climate scenarios. Behavioral models can capture portfolio diversification benefits that agro-economic models cannot measure. **Keywords: Climate change; Africa; Integrated farm; Livestock; Adaptation; Micro econometrics**
	Social and economic aspects of peatland management in Northern Europe, with particular reference to the English case/ A. Rawlins, J. Morris. **Geoderma, Volume 154, Issues 3-4, 15 January 2010, Pages 242-**

	251, ISSN 0016-7061, DOI: 10.1016/j.geoderma.2009.02.022. (http://www.sciencedirect.com/science/article/B6V67-4VY6FTG-1/2/113cd5ceb5e94937333d4471a8c3b61e) Abstract: Most of the pressures on peat soils that are responsible for their declining state are associated with human interventions, most notably land drainage for agriculture. Deteriorating stocks of peat soils and degradation of related ecosystem service flows have impacts not only on immediate users but also on society as a whole. It is important therefore that strategies to address these issues fully integrate socio-economic factors as they influence the pressures, help interpret the impacts, and justify suitable interventions to deliver sustainable management of peat soils. In this context, using a combination of stakeholder analysis and the functions, uses and values framework, stakeholder preferences for peatland functions were explored, along with the current drivers and associated responses in peatland areas. It was found that non-use values such as nature conservation are more prevalent now than in the past, and that agricultural economics has reflected this. It was also found that a high value placed is on the agricultural use of peatlands, and its associated benefits. Indeed, in the context of very recent strengthening of food prices in response to global deficits, there is renewed interest in sustaining the productive capacity of peatlands for some types of intensive farming. Although reconciling differing stakeholder interests is not easy, there is opportunity to develop a policy framework to encourage wise peatland management systems across Northern Europe. This requires that peatland ecosystems are explicitly incorporated into peatland management decisions. **Keywords: Peatland; Economics; Stakeholder analysis; Ecosystems; Soils**
	The economic impact of more sustainable water use in agriculture: A computable general equilibrium analysis/ Alvaro Calzadilla, Katrin Rehdanz, Richard S.J. Tol, Journal of Hydrology, Volume 384, Issues 3-4, Green-Blue Water Initiative (GBI), 30 April 2010, Pages 292-305, ISSN 0022-1694, DOI: 10.1016/j.jhydrol.2009.12.012. (http://www.sciencedirect.com/science/article/B6V6C-4XY4GTV-1/2/d4b7fc69e0841ecf7ab8e1776c60d93d) **Abstract: Summary** Agriculture is the largest consumer of freshwater resources - around 70 percent of all freshwater withdrawals are used for food production. These agricultural products are traded internationally. A full understanding of water use is, therefore, impossible without understanding the international market for food and related products, such as textiles. Based on the global general equilibrium model GTAP-W, we offer a method for investigating the role of green (rain) and blue (irrigation) water resources in agriculture and within the context of international trade. We use future projections of allowable water withdrawals for surface water and groundwater to define two alternative water management

	scenarios. The first scenario explores a deterioration of current trends and policies in the water sector (water crisis scenario). The second scenario assumes an improvement in policies and trends in the water sector and eliminates groundwater overdraft world-wide, increasing water allocation for the environment (sustainable water use scenario). In both scenarios, welfare gains or losses are not only associated with changes in agricultural water consumption. Under the water crisis scenario, welfare not only rises for regions where water consumption increases (China, South East Asia and the USA). Welfare gains are considerable for Japan and South Korea, Southeast Asia and Western Europe as well. These regions benefit from higher levels of irrigated production and lower food prices. Alternatively, under the sustainable water use scenario, welfare losses not only affect regions where overdrafting is occurring. Welfare decreases in other regions as well. These results indicate that, for water use, there is a clear trade-off between economic welfare and environmental sustainability. **Keywords: Agricultural water use; Computable general equilibrium; Irrigation; Sustainable water use**
	The impact of changing agricultural policies on jointly used rough pastures in the Bavarian Pre-Alps: An economic and ecological scenario approach/ Norbert Roeder, Dirk Lederbogen, Juergen Trautner, Ariel Bergamini, Silvia Stofer, Christoph Scheidegger, Ecological Economics, Volume 69, Issue 12, 15 October 2010, Pages 2435-2447, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2010.07.013. **(http://www.sciencedirect.com/science/article/B6VDY-50T35X1-2/2/20ab4a5f7424e67484e1df583aeeed3c)** **Abstract:** The paper assesses the impact of different policy options on the land use and associated biodiversity values of jointly organised low-intensity grazing systems (`Allmende') in Bavaria. We use an integrated economic and ecological modelling approach to compare three scenarios with the situation in 2003/05. We base the economic sub-model on single farms, which alter their land use in response to economic stimuli. Within the economic part, factors like the farm's endowment with machinery and quota are regarded. Within the rule-based ecological sub-model we analyse: area of protected habitats according to the EC Habitats Directive; biodiversity for selected taxonomic groups and habitat quality for different target species. An overall evaluation of the scenarios indicates that decoupling has a limited effect, because higher direct payments compensate the effect of lower product prices. If all payments are strictly targeted to agri-environmental measures and set to a level which guarantees a low-input management of the grassland, the public costs could be reduced and additional habitats for the target species could be provided. Regarding all indicators but the extent of protected habitats and the public costs, a scenario with a cessation of public payments and market liberalisation performs the worst. **Keywords: Agriculture; CAP; Decoupling; Biodiversity; EC Habitats Directive; Agent-based modelling**

	The optimal boundary of political subsidies for agricultural insurance in welfare economic prospect/ Xu Yuanchang, Jiang Jiyu. Agriculture and Agricultural Science Procedia, Volume 1, International Conference on Agricultural Risk and Food Security 2010, 2010, Pages 163-169, ISSN 2210-7843, DOI: 10.1016/j.aaspro.2010.09.020. (http://www.sciencedirect.com/science/article/B6PHT-516WWBS-P/2/e3a15be55b05be422eedb3dc9e997816) Abstract: China is one of the most suffering countries in agriculture by Nature. The current statistics shows a growing lose by agriculture risk. Insurance, as a lack part in the agricultural risk management, is constraining the ability to defense the risk and the sustainable development for our modern agriculture. Either sufficient or deficient in political subsidies will cause welfare deadweight loss. The article analyzed the optimal boundary of the fiscal subsidies based on the welfare loss model in agricultural insurance. We're trying to reduce the benefit loss due to asymmetric information, optimize the efficiency of fiscal transfers and enhance the farmers' welfare. We also like to give several suggestions in how to promote our political subsidies in agricultural insurance. **Keywords: agricultural insurance; welfare loss; optimal subsidies' boundary**
	The potential contribution of forage shrubs to economic returns and environmental management in Australian dryland agricultural systems/ Marta Monjardino, Dean Revell, David J. Pannell. **Agricultural Systems, Volume 103, Issue 4, May 2010, Pages 187-197, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.12.007.** (http://www.sciencedirect.com/science/article/B6T3W-4YBX1TJ-1/2/4567510a4f25f46c0d7fea529c4c1e07) Abstract: In face of climate change and other environmental challenges, one strategy for incremental improvement within existing farming systems is the inclusion of perennial forage shrubs. In Australian agricultural systems, this has the potential to deliver multiple benefits: increased whole-farm profitability and improved natural resource management. The profitability of shrubs was investigated using Model of an Integrated Dryland Agricultural System (MIDAS), a bio-economic model of a mixed crop/livestock farming system. The modelling indicated that including forage shrubs had the potential to increase farm profitability by an average of 24% for an optimal 10% of farm area used for shrubs under standard assumptions. The impact of shrubs on whole-farm profit accrues primarily through the provision of a predictable supply of `out-of-season' feed, thereby reducing supplementary feed costs, and through deferment of use of other feed sources on the farm, allowing a higher stocking rate and improved animal production. The benefits for natural resource management and the environment

	include improved water use through summer-active, deep-rooted plants, and carbon storage. Forage shrubs also allow for the productive use of marginal soils. Finally, we discuss other, less obvious, benefits of shrubs such as potential benefits on livestock health. The principles revealed by the MIDAS modelling have wide application beyond the region, although these need to be adapted on farm and widely disseminated before potential contribution to Australian agriculture can be realized. **Keywords: Whole-farm modelling; MIDAS; Economics; Perennial species; Erosion; Carbon emissions; Sequestration; Animal health**

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	A case study of socio-economic returns from farm forestry and agriculture in south-east Australia during 1993-2007/ Hugh T.L. Stewart, Digby H. Race, Allan L. Curtis, Andrew J.K. Stewart, Forest Policy and Economics, In Press, Corrected Proof, Available online 8 April 2011, ISSN 1389-9341, DOI: 10.1016/j.forpol.2011.03.004. **(http://www.sciencedirect.com/science/article/B6VT4-52K1C57-2/2/77216d19e1bf37193a707c87b66f37f1)** **Abstract:** In Australia, a national policy was launched in 1997 to enhance regional wealth and international competitiveness of forest industries through a sustainable increase in plantations. An element of the policy was the development of a commercial forestry and farm forestry culture. In this context, farm forestry was intended to provide the opportunity to integrate smaller-scale plantations into agricultural landscapes on private land. Against this background, a study was undertaken to analyse the socio-economic returns from farm forestry in a case study in south-east Australia. Financial information during 1993-2007 for livestock grazing and 8 ha of blue gum (Eucalyptus globulus) was analysed to compare the profitability of farming and farm forestry. During this period, a full cycle of blue gum (14 years) to produce pulp logs was completed with a forestry company under a tree farming agreement. The blue gum was integrated with the livestock enterprise by planting the trees in belts that were mostly 10 rows or 30 m wide positioned 250-300 m apart and located strategically on productive agricultural land along land-class boundaries. For the blue gum farm forestry, the net present value to the farmer expressed in 1993 dollars was $1236/ha compared to $768/ha for livestock grazing during 1993-2007. The farmer reported they had successfully integrated farm forestry as a land-use, and that the farm forestry had provided important environmental benefits and social benefits. The farmer was committed to farm forestry being part of the diversified farming business into the future, with the management of a second crop of blue gum on the farm underway. **Keywords: Agriculture; Farm forestry; Blue gum; Victoria; Australia**

A sustainable system of a traditional precision agriculture in a Maya homegarden: Soil quality aspects/ Lourdes Flores-Delgadillo, Scott L. Fedick, Elizabeth Solleiro-Rebolledo, Sergio Palacios-Mayorga, Pilar Ortega-Larrocea, Sergey Sedov, Esteban Osuna-Ceja
Soil and Tillage Research, Volume 113, Issue 2, June 2011, Pages 112-120, ISSN 0167-1987, DOI: 10.1016/j.still.2011.03.001.
(http://www.sciencedirect.com/science/article/B6TC6-52K1390-1/2/e9117b87ccc7111f36f796e0eb97ce7b)

Abstract:
Homegardens or 'solares' have a long history of intensive cultivation by the Maya in southeastern Mexico and Central America, and have recently been the subject of increasing studies that characterize them as 'multistrata agroforestry systems', although no soil evaluation has been reported. We have conducted this study in a traditional homegarden named 'El Naranjal', a rural village in the north of Quintana Roo, Mexico, in order to evaluate soil date and quality from this specific site, being the soil the main factor of this traditional Maya agroforestry management system. The 14C analysis of the A1 horizon humic fraction, from the deepest soil profile exposed in a karstic depression, gave a date that corresponds with the occupation of the site at the Maya peak of the mayan possession from the Late Preclassic to Early Classic transition, beginning about 100 B.C. The soils found (Rendzic Leptosols) into El Naranjal homegarden are well structured, very dark brown, shallow, and have an abrupt contact with the limestone bedrock at a highly variable depth. According to this fact, soil depth showed along the studied transect, the highest variation (variation coefficient = 72%) compared to Ranch Santa Maria (VC = 46.3%) and El Eden (43%) soils, being sites with similar heterogeneity degrees. The pH values ranged from neutral to moderately basic (7.10-8.00); this parameter that influences the humification and mineralization processes, showed a low VC (3.37%). Organic matter content varied from high to very high (7.30-20.23%, at 30-80 cm deep, and ranged in the deepest soil profiles from 2.00% to 3.98%). High levels of P retention (21.5-83.0%) were found; this characteristic is related to high values of exchangeable Ca2+ and dithionite-extractable Fe, present in all studied profiles. The soils are clayish and have middle to high values of hydraulic conductivity (4.8-64.8 cm h-1) that displayed a high VC (65.74%). The values of the 'S' index (soil physical quality index) fluctuated between 0.059 and 0.068, indicating good physical soil quality, with regard to the proposed critical value of 0.035. According to other physical and chemical properties, it was found that the soils from this homegarden have favorable qualities for air transport, heat, water and soluble substances. The iron oxides and organic components are responsible for soil color, high aggregation with good stability and consequently of their high porosity. But, on the other hand, the highly variable soil depth (often insufficient for the development of root systems) and the large level of P retention (phosphorus-fixing capacity) are the most obvious physical and chemical disadvantages to crop growth. These are also the most common and restrictive factors in many soils from the Yucatan Peninsula. However, results showed that

	the cultivation system, successfully employed in the homegarden, uses an uncommon edaphic environment. This occurs through a traditional crop adaptation to particular areas of thicker soils ('containers'), known traditionally as 'precision agriculture'. **Keywords: Homegarden; Agroecosystems; Agroforestry; Traditional Maya agriculture; Soil depth; Soil quality**
	An integrated hydro-economic modelling framework to evaluate water allocation strategies I: Model development/ Biju George, Hector Malano, Brian Davidson, Petra Hellegers, Luna Bharati, Sylvain Massuel. Agricultural Water Management, Volume 98, Issue 5, March 2011, Pages 733-746, ISSN 0378-3774, DOI: 10.1016/j.agwat.2010.12.004. (http://www.sciencedirect.com/science/article/B6T3X-51TXP3F-1/2/5a5cdaabd81282912d512e3fd002e4a6) Abstract: In this paper an integrated modelling framework for water resources planning and management that can be used to carry out an analysis of alternative policy scenarios for water allocation and use is described. The modelling approach is based on integrating a network allocation model (REALM) and a social Cost Benefit economic model, to evaluate the physical and economic outcomes from alternative water allocation policies in a river basin or sub-basin. From a hydrological perspective, surface and groundwater models were first applied to assess surface and groundwater resource availability. Then an allocation model was applied to reconcile the calculated surface and groundwater resources. From an economic perspective initially the value of water allocated to different uses in each demand centre within the system was estimated. These values were then placed in a social Cost Benefit Analysis to assess the economic consequences of different allocation scenarios over time and space. This approach is useful as it allows policymakers to consider not only the physical dimensions of distributing water, but also the economic consequences associated with it. This model is considered superior to other models as water is increasingly being seen as an economic good that should be allocated according to its value. The framework outlined in this paper was applied to the Musi sub-basin located in the Krishna Basin, India. In applying this framework it was concluded that competition for Musi water is very high, the transfer of water from agriculture to urban users is likely to grow in future and the value of water used in different agricultural zones is very low. **Keywords: Water allocation; Hydro-economics; Krishna basin; Musi**
	Bio economic modeling for a sustainable management of biodiversity in agricultural lands/ L. Mouysset, L. Doyen, F. Jiguet, G. Allaire, F. Leger, Ecological Economics, Volume 70, Issue 4, 15 February 2011, Pages 617-626, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2010.12.006. (http://www.sciencedirect.com/science/article/B6VDY-51YGND7-2/2/8b4f9e7ae9977b6b43811a50843d06f3)

	Abstract: For several decades, significant changes in farmland biodiversity have been reported in Europe. Agriculture is a major driver of these modifications. Taking into account these environmental impacts, agriculture nowadays aims at a more sustainable way of producing which would reconcile its economic and ecological functions. The objective of this paper is to give insights into the impact of public policies on both conservation of biodiversity and farming production. We develop a macro-regional model combining community dynamics of 34 bird species impacted by agricultural land-uses and an economic decision model. The ecological dynamic model is calibrated with the STOC (French Breeding Bird Survey) and AGRESTE (French land-uses) databases while the economic model relies on the gross margins of the FADN (Farm Accountancy Data Network). We investigate the scenario based on subsidies and taxes. We show that simple economic instruments could be used to establish scenarios promoting economic performances and bird populations. It is pointed out how the sustainability of the policies is sensitive to the ecological and economic indicators used by the planner. The bio-economical analysis shows several solutions for the ecology-economy trade-off. These results suggest that many possibilities are available to develop multi-functional sustainable agriculture. **Keywords: Biodiversity; Agriculture; Bioeconomic modeling; Sustainability; Bird; Land-use**
	Cost-effectiveness of groundwater conservation measures: A multi-level analysis with policy implications/ Irene Blanco-Gutierrez, Consuelo Varela-Ortega, Guillermo Flichman. **Agricultural Water Management, Volume 98, Issue 4, February 2011, Pages 639-652, ISSN 0378-3774, DOI: 10.1016/j.agwat.2010.10.013.** (http://www.sciencedirect.com/science/article/B6T3X-51PGKVC-1/2/36435e7e936d657e3367bc060e224bdc) Abstract: Groundwater in Spain, as in other arid and semiarid countries worldwide, has been widely used in the expansion of irrigated agriculture. In the Spanish Mancha Occidental aquifer, the excessive, and sometimes illegal, water abstraction for irrigation has promoted outstanding socioeconomic development in the area, but it has also resulted in exploitation of the aquifer and degradation of valuable wetlands. Water policies implemented in the region have not yet managed to restore the aquifer and face strong social opposition. This paper uses a multi-scale modeling approach to explore the environmental and socio-economic impacts of alternative water conservation measures at the farm and basin levels. It also analyzes their comparative cost-effectiveness to help policy makers identify the least costly policy option for achieving the goal of the Mancha Occidental aquifer's sustainability. To conduct this analysis, a Mathematical Programming Model has been developed to simulate: the closing-up and taxed-legalization of unlicensed wells, uniform volumetric and block-rate

	water prices, water quotas, and water markets. Aggregate results show that net social costs are not substantially different across policy option, so none of the considered policy options will be clearly more cost-effective than the others. However, there are significant differences between private and public costs (at the farm and sub-basin levels), which will be critical for determining the application in practice of these policies. Results show that controlling illegal water mining (through the legalization of unlicensed wells) is necessary, but is not sufficient to recover the aquifer. Rather, effective water management in this area will require the implementation of other water management policies as well. Among them, uniform volumetric and block-rate water pricing policies will entail the lowest net social cost, but will produce important income losses in the smallest and most water-intensive farms, which might put at risk the viability of these farms and the social acceptance of the policies. Further investigations on social costs, policy enforcement capacity and public participation in water management are highly recommended. **Keywords: Groundwater resources; Irrigation; Wetlands conservation; Multi-scale economic modeling; Water policies; Cost-effectiveness analysis**
	Cuban agricultural policy in the last 25 years. From conventional to organic agriculture/ J.M. Febles-Gonzalez, A. Tolon-Becerra, X. Lastra-Bravo, X. Acosta-Valdes, Land Use Policy, In Press, Corrected Proof, Available online 15 January 2011, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2010.12.008. (http://www.sciencedirect.com/science/article/B6VB0-51YGH73-1/2/0866f1cb204c53833f567895c9a268be) **Abstract:** Political, social, economic and environmental changes undergone in Cuba in recent decades have led to several well-differentiated production models or systems, and have led to profound transformation of Cuban farmland. This article analyses those changes and transformations in three key stages or chronological periods of Cuban agricultural policy, the Green Revolution, the Special Period and Economic Reanimation. The analysis emphasizes the environmental, social and economic effects of each period, and especially, the change from a conventional intensive to an alternative or organic farming system, which has become an example to be followed. **Keywords: Agricultural policy; Land management; Urban agriculture; Organic agriculture; Cuba**
	Economic analysis of drought risk: An application for irrigated agriculture in Spain/ Marina Gil, Alberto Garrido, Almudena Gomez-Ramos, Agricultural Water Management, Volume 98, Issue 5, March 2011, Pages 823-833, ISSN 0378-3774, DOI: 10.1016/j.agwat.2010.12.008. (http://www.sciencedirect.com/science/article/B6T3X-523CPS0-1/2/684557432d017226e96e2989a93ae6d0)

	Abstract: This paper describes a two-part methodology for managing the risk posed by water supply variability to irrigated agriculture. First, an econometric model is used to explain the variation in the production value of irrigated agriculture. The explanatory variables include an index of irrigation water availability (surface storage levels), a price index representative of the crops grown in each geographical unit, and a time variable. The model corrects for autocorrelation and it is applied to 16 representative Spanish provinces in terms of irrigated agriculture. In the second part, the fitted models are used for the economic evaluation of drought risk. Inflow variability in the hydrological system servicing each province is used to perform ex-ante evaluations of economic output for the upcoming irrigation season. The model's error and the probability distribution functions (PDFs) of the reservoirs' storage variations are used to generate Monte Carlo (Latin Hypercube) simulations of agricultural output 7 and 3 months prior to the irrigation season. The results of these simulations illustrate the different risk profiles of each management unit, which depend on farm productivity and on the probability distribution function of water inflow to reservoirs. The potential for ex-ante drought impact assessments is demonstrated. By complementing hydrological models, this method can assist water managers and decision makers in managing reservoirs. **Keywords: Drought; Irrigation; Economic risk; Monte Carlo simulation**
	Economic cycles and environmental crisis in arid southeastern Spain. A historical perspective/ A. Sanchez-Picon, J.A. Aznar-Sanchez, J. Garcia-Latorre, Journal of Arid Environments, In Press, Corrected Proof, Available online 26 January 2011, ISSN 0140-1963, DOI: 10.1016/j.jaridenv.2010.12.014. **(http://www.sciencedirect.com/science/article/B6WH9-521N86W-1/2/572b44bf29d382cc3eb54d4b08954c1a)** **Abstract:** The arid southeast region has been one of the areas with the oldest settlement in the Iberian Peninsula. Despite limitations imposed by lack of water and low soil fertility, a great number of dwellers have settled in this land for three thousand years thanks to its easy access to the commercial paths of the Mediterranean. The area is currently under great territorial and socioeconomic transformation activated by intensive agriculture through greenhouses and irrigation. The history of this territory offers a series of successful and downward cycles determined, from an ecological and economic point of view, by its integration in different stages of the globalization process. Most recently, in the 19th century an intensive deforestation process took place caused by the mining and iron industry. The deep economic and social crisis which followed the declining of this development model brought also about an ecological crisis. In the second half of the 20th century, negative environmental effects have continued and extended to the next generations with problems such as territorial saturation and aquifer depletion that characterize the new intensive agriculture under plastic.

	The current debate about the sustainability of this developmental model in such vulnerable environment can take advantage of some ecological lessons from the past. **Keywords: Environmental history; Economic cycles; Environmental crisis; Southeastern Spain**
	Economic returns from fungicide application to control foliar fungal diseases in winter wheat/ Stephen N. Wegulo, Michael V. Zwingman, Julie A. Breathnach, P. Stephen Baenziger. **Crop Protection, Volume 30, Issue 6, June 2011, Pages 685-692, ISSN 0261-2194, DOI: 10.1016/j.cropro.2011.02.002.** (http://www.sciencedirect.com/science/article/B6T5T-52C83R3-1/2/94748fa5e8760c8cf4c69bc80bf57dc4) Abstract: Fungicides are commonly applied to control foliar fungal diseases of winter wheat in the central Great Plains of the United States and often are routinely recommended. However, economic benefits from fungicide application in winter wheat have rarely been quantified in this region. A total of eight field experiments were conducted in 2006 and 2007 in Nebraska, USA to quantify yield increases from fungicide applications to control foliar fungal diseases in winter wheat. Experiments were conducted at the same four locations (Mead, Clay Center, North Platte and Sidney) in both years. The fungicides used were azoxystrobin + propiconazole, pyraclostrobin, propiconazole, azoxystrobin and trifloxystrobin + propiconazole applied at varying rates and growth stages. Average wheat prices were calculated from data provided by the United States Department of Agriculture (USDA) Agricultural Marketing Service. Average fungicide and fungicide application costs were obtained through surveys of local retailers, chemical manufacturers and commercial applicators. These prices and costs were used to calculate net returns from fungicide treatments. The probability of a positive net return was 0.60, 1.00 and 0.80 in 2006 (dry, low disease severity), 2007 (wet, moderate to high disease severity) and both years combined, respectively. Net returns ranged from $-101 ha-1 to $172 ha-1 in 2006 and from $60 ha-1 to $294 ha-1 in 2007. Net returns were at least two times the total cost ($2 return on $1 investment) in 4 out of 60 or 6.7% of treatments in 2006 and 51 out of 60 or 85% of treatments in 2007. In 2006, the best net returns occurred at Mead and Clay Center and resulted from the treatments 1) azoxystrobin + propiconazole applied at Zadoks growth stage (GS) 31 (first node detectable) at a rate of 0.58 l ha-1 and 2) azoxystrobin + propiconazole applied at GS 31 at a rate of 0.58 l ha-1 and again at GS 37 (flag leaf just visible) at the same rate. In 2007, the treatments that resulted in the best net returns were 1) azoxystrobin + propiconazole applied at GS 39 (ligule/collar of flag leaf just visible) at a rate of 1.02 l ha-1, 2) pyraclostrobin applied at GS 39 at a rate of 0.66 l ha-1, 3) propiconazole applied at GS 39 at a rate of 0.29 l ha-1, and 4) trifloxystrobin + propiconazole applied at GS 39 at a rate of 0.73 l ha-1. For the same fungicide applied at the same rate at GS 31 and GS 39 in

	2007 (wet, moderate to high disease severity), the GS 39 application generally resulted in a higher net return than the GS 31 application. Averaged across treatments and locations, net returns were $6 ha-1 and $183 ha-1 in 2006 and 2007, respectively. The results from this study indicate that foliar fungicide application to winter wheat can be profitable in years with moderate to high disease severity; however, net loss can result if fungicides are applied in years with low disease severity. **Keywords: Winter wheat; Foliar fungal diseases; Tan spot; Spot blotch; Fungicides; Net returns; Profitability**
	Hope and skepticism: Farmer and local community views on the socio-economic benefits of agricultural bioenergy/ Alissa M. Rossi, C. Clare Hinrichs. **Biomass and Bioenergy, Volume 35, Issue 4, Socioeconomic Dimensions of US Bioenergy, April 2011, Pages 1418-1428, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2010.08.036.** (http://www.sciencedirect.com/science/article/B6V22-511KB1G-1/2/99767bebe21c4349f3d12a203bdbfe35) Abstract: U.S. government policies and programs promoting agricultural bioenergy development have tended to prioritize national goals of energy security, economic growth and environmental improvement, while marginalizing the local experiences, views and concerns of farmers and rural communities that will produce the needed energy crops. Based on qualitative field interviews with 48 farming and non-farming participants in two switchgrass bioenergy projects (in southern Iowa and in northeastern Kentucky), this paper examines local perspectives on the potential opportunities, drawbacks, and tradeoffs of the emerging agricultural bioeconomy for rural people and places. Individual project participants expressed both positive and negative perceptions about the impacts of the agricultural bioeconomy, with local and regional revitalization being the benefit most desired and also least expected. Skepticism about the social impacts of the agricultural bioeconomy often stemmed from observations of corporate control in agriculture more generally. This research suggests that narrow instrumental views of farmers and rural communities as technical providers of energy feedstocks can be misleading, because they omit the local social and cultural context that complicates rural responses and receptivity to the development of the agricultural bioeconomy. **Keywords: Co-firing; Ethanol; Iowa; Kentucky; Panicum virgatum; Rural revitalization**
	Impacts of population growth, economic development, and technical change on global food production and consumption/ Uwe A. Schneider, Petr Havlik, Erwin Schmid, Hugo Valin, Aline Mosnier, Michael Obersteiner, Hannes Bottcher, Rastislav Skalsky, Juraj Balkovic, Timm Sauer, Steffen Fritz. **Agricultural Systems, Volume 104, Issue 2, Methods and tools for integrated**

	assessment of sustainability of agricultural systems and land use, Conference on Integrated Assessment of Agriculture and Sustainable Development: Setting the Agenda for Science and Policy, February 2011, Pages 204-215, ISSN 0308-521X, DOI: 10.1016/j.agsy.2010.11.003. (http://www.sciencedirect.com/science/article/B6T3W-51ST6X4-1/2/9ac6028911c99cc262031f9bb4d5ea45) Abstract: Over the next decades mankind will demand more food from fewer land and water resources. This study quantifies the food production impacts of four alternative development scenarios from the Millennium Ecosystem Assessment and the Special Report on Emission Scenarios. Partially and jointly considered are land and water supply impacts from population growth, and technical change, as well as forest and agricultural commodity demand shifts from population growth and economic development. The income impacts on food demand are computed with dynamic elasticities. Simulations with a global, partial equilibrium model of the agricultural and forest sectors show that per capita food levels increase in all examined development scenarios with minor impacts on food prices. Global agricultural land increases by up to 14% between 2010 and 2030. Deforestation restrictions strongly impact the price of land and water resources but have little consequences for the global level of food production and food prices. While projected income changes have the highest partial impact on per capita food consumption levels, population growth leads to the highest increase in total food production. The impact of technical change is amplified or mitigated by adaptations of land management intensities. **Keywords: Food security; Population growth; Irrigation water scarcity; Income development; Engel curve; Agricultural sector optimization**
	Impacts of population growth, economic development, and technical change on global food production and consumption, Agricultural Systems, Volume 104, Issue 2, Methods and tools for integrated assessment of sustainability of agricultural systems and land use/ Uwe A. Schneider, Petr Havlik, Erwin Schmid, Hugo Valin, Aline Mosnier, Michael Obersteiner, Hannes Bottcher, Rastislav Skalsky, Juraj Balkovic, Timm Sauer, Steffen Fritz. Conference on Integrated Assessment of Agriculture and Sustainable Development: Setting the Agenda for Science and Policy, February 2011, Pages 204-215, ISSN 0308-521X, DOI: 10.1016/j.agsy.2010.11.003. (http://www.sciencedirect.com/science/article/B6T3W-51ST6X4-1/2/9ac6028911c99cc262031f9bb4d5ea45) Abstract: Over the next decades mankind will demand more food from fewer land and water resources. This study quantifies the food production impacts of four alternative development scenarios from the Millennium Ecosystem Assessment and the Special Report on Emission Scenarios. Partially and jointly considered are land and water supply impacts from population growth, and technical change,

	as well as forest and agricultural commodity demand shifts from population growth and economic development. The income impacts on food demand are computed with dynamic elasticities. Simulations with a global, partial equilibrium model of the agricultural and forest sectors show that per capita food levels increase in all examined development scenarios with minor impacts on food prices. Global agricultural land increases by up to 14% between 2010 and 2030. Deforestation restrictions strongly impact the price of land and water resources but have little consequences for the global level of food production and food prices. While projected income changes have the highest partial impact on per capita food consumption levels, population growth leads to the highest increase in total food production. The impact of technical change is amplified or mitigated by adaptations of land management intensities. **Keywords: Food security; Population growth; Irrigation water scarcity; Income development; Engel curve; Agricultural sector optimization**
	Kirsten M. Kienzler, Nodir Djanibekov, John P.A. Lamers, An agronomic, economic and behavioral analysis of N application to cotton and wheat in post-Soviet Uzbekistan, Agricultural Systems, Volume 104, Issue 5, June 2011, Pages 411-418, ISSN 0308-521X, DOI: 10.1016/j.agsy.2011.01.005. (http://www.sciencedirect.com/science/article/B6T3W-526YMMG-1/2/7772668f0e0f0df269f5bbf1556d7833) **Abstract:** Cotton and winter wheat play a vital role in Uzbek agriculture: the first crop is a vital component of the national export revenues, while the latter is key in achieving independence from grain imports. Due to these strategic roles in the national economy, both crops are part of the state procurement system and, hence, are subject to strict regulations imposed to ensure budget revenues and self-sufficiency. However, many factors cause the divergence of crop yields from their technically maximum levels. We analyzed those factors, which hamper achieving the optimum response to fertilizer applications. In a stepwise procedure, we (i) reviewed the technical and financial optimum yield responses of cotton and winter wheat production to fertilizer applications and (ii) analyzed the changes of fertilizer-to-product price ratios to shed light on the agronomic and economic performance of cotton and wheat in the post-Soviet agricultural system of Uzbekistan. The analysis combined data from long-term, historical yield and fertilizer responses, agronomic N-fertilizer response experiments, and socio-economic farm surveys. Quadratic yield-response functions were used to derive economic and technical optimum rates of N-fertilizer applications. Based on the parameterized function and fertilizer-to-product price ratios observed for 1996-2003, we analyzed the difference between recommended fertilization and economic optimum application rates. Results showed that under the state procurement system, Uzbek farmers may not necessarily tend to maximize the profits from their cotton and wheat production. The level of subsidies and the differential crop support by the state induce farmers to follow the official fertilizer recommendations to ensure that they fulfill the production targets even

	if it implies higher production costs. The present gaps between the officially recorded yields and those technically achievable given the agro-ecological conditions in Uzbekistan cannot be narrowed by only improving N-fertilizer management. It would require additional efforts to improve cotton and wheat yields. **Keywords: Cotton; Winter wheat; Yield gap analysis; N-fertilizer use; Economic optimum; Uzbekistan**
	Policies to support economic and environmental goals at farm and regional scales: Outcomes for rice farmers in Southern India depend on their resource endowment/ K. Senthilkumar, M.T.M.H. Lubbers, N. de Ridder, P.S. Bindraban, T.M. Thiyagarajan, K.E. Giller. **Agricultural Systems, Volume 104, Issue 1, January 2011, Pages 82-93, ISSN 0308-521X, DOI: 10.1016/j.agsy.2010.10.001.** (http://www.sciencedirect.com/science/article/B6T3W-51FG28C-1/2/d6cf0afe6ce7cd97207f438b11ffa2ac) Abstract: Improving water use and nitrogen efficiencies is of overall importance to society at large - to conserve scarce water resources and prevent environmental pollution. Efficient cultivation practices for rice which had no yield penalty were not adopted by farmers because of the open access to water free of charge. Well-chosen combinations of policy measures are thus needed to stimulate adoption of new cultivation practices. We developed a multi-objective linear programming (MGLP) model to explore the impact of: (i) modified rice cultivation including water-saving irrigation on farm profit; (ii) water pricing and water quota government policies on adoption of modified rice cultivation by farmers; (iii) a combination of (i) and (ii) to achieve the objectives of both farmers and society at large, and (iv) to study the trade-offs between income, water and nitrogen use. The analysis was carried out on four rice-based farm types for the state of Tamil Nadu, South India. Model results showed that observed farm profit of all four farm types could be increased using current practices simply by optimizing land use for specific crops. Adoption of modified rice cultivation further increased farm profit. Water-saving practices were selected only when water pricing was introduced. Farm profits were reduced even at low water prices but were compensated by farmers through adoption of modified rice cultivation. The combination of policies that stimulate adoption of modified rice cultivation was effective in achieving both increased farm income and water savings. The required water prices differed across farm types and seasons and impacted poor resource-endowed farmers the most. Providing water quotas could protect the poor resource-endowed farmers. The model helped to identify the optimal water price and water quota for each farm type to achieve both the objectives of farmers and society at large. Opportunities for reducing water use and avoiding environmental pollution at acceptable profits are available for all farm types, but need to be tailored to the farmers' resource endowments. **Keywords: Modified rice cultivation; Linear programming; Water pricing**

	policy; Water-saving irrigation; Nitrogen balance; Trade-off analysis