Essential Readings in Environmental Law
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SUSTAINABLE AGRICULTURE

Marcia Fajardo Cavalcanti de Albuquerque, Ph. D. candidate, Paris 1 - Panthéon Sorbonne University, France and Mackenzie University of São Paulo, Brazil

OVERVIEW OF KEY SCHOLARSHIP

1. Raman, S., Agricultural Sustainability: Principles, Processes, and Prospects, (2006) Food Products Press: New York, London, Oxford.
2. Van Dam, D., M. Streith, J. Nizet, and P.M. Stassart, (Coord.), Agroécologie: entre pratiques et sciences sociales, (2012) Educagri Editions: Dijon.
3. Bohlen, P. J. and G. House, (ed.), Sustainable Agroecosystem Management: Integrating Ecology, Economics and Society, (2009) CFC Press: Boca Raton.
4. Edwards, C.A., R. Lal, P. Madden, R. Miller, and G. House, Sustainable Agricultural Systems, (1990) Soil and Water Conservation Society: Iowa; St. Lucy Press: Florida.
5. Gitau, T., M.W. Gitau, D. Waltner-Toews, Integrated Assessment of Health and Sustainability of Agroecosystems, (2008) CRC Press: London and New York.
6. McNeely, J. A. and S.J. Scherr, Ecoagriculture: Strategies to feed the world and save wild biodiversity, (2009) Island Press: Washington, DC.
7. Santili, J., Agrobiodiversidade e Direito dos Agricultores, (2009), Editora Peiropolis: São Paulo.
8. Christophe, B. and R. Perez, (ed.), Agro-ressources et écosystèmes : enjeux sociaux et pratiques managériales, (2012) Presses Universitaires du Septentrion: Villeneuve d' Ascq.
9. Falque, M. and H. Lamotte, (ed.), Ressources agricoles et forestières : droit de propriété, économie et environnement, (2014) Bruylant : Bruxelles.
10. Monteduro, M., Environmental law and agroecology: Transdisciplinary approach to Public Ecosystem Services as a new challenge for environmental legal doctrine, (2013) European Energy and Environmental Law Review, p. 1-11.

Background:

Agriculture occupies a very important place among sustainability concerns. Food and fiber are essential human needs and the achievement of sustainable development is deeply connected to the adoption of sustainable farming practices. This is why the Brundtland Commission Report (WCED, 1987) encouraged the implementation of agricultural systems "that focus as much attention on people as they do on technology, as much on resources as on production, as much on the long term as on the short term." But, what is sustainable agriculture? This concept is not easy to define as it depends on the definitions of both « agriculture » and « sustainability » (Yunlong and Smit, 1994).

According to Smit and Smithers (1993 p. 499), « agriculture is a globally occurring activity which relates directly and powerfully to the present and future condition of environments, economies, and societies ». Yunlong and Smit (1994) define agriculture as a complex activity that involves economics, technology, politics, sociology, international relations, trade, biology and environmental problems. It is a multifunctional activity; a concept that is many-sided. It depends on the biophysical environment (natural world within which agriculture operates), on the social-political environment (the human influence on agriculture - demand for food, culture, policies and government's action) and on the economic and technological environment (constraints that may arise regarding the feasibility and viability of agricultural activities). Marsh (1997) believes that the agricultural system is self-destructive, once it depends on various natural, human and economic resources and sooner or later it will be incapable of continuation. Thus, agriculture should be based on sustainability principles.

Sustainability, in turn, covers three dimensions: 1) ecological: the maintenance of biophysical processes and conditions; the guarantee of continued productivity and functioning of ecosystems; 2) social: the continued satisfaction of basic human needs; provision of agricultural products in adequate quantity and quality; long term food sufficiency both intra-generational - fair and equitable distribution and access to the resources- and inter-generational - the right of future generations to benefit from the same resources which are in use today; 3) economic: sustainability of yield related to economic performance and viability of farming (Smit and Yunlong, 1994).

Sustainable agriculture could be understood as an activity which is respectful to the environment, socially just and economically viable. It is aimed at satisfying the human needs while conserving the quality of the resources, with little or no negative effects on the environment (Gitau *et al.*, 2008).

Smit and Smithers (1993) highlight the four paradigms of sustainable agriculture: eco-farming, agroecology, food security and social equity. According to these authors, eco-farming is the adoption of low input agriculture and it « seeks to identify and implement management practices at the farm level which minimize environmental impact while maintaining high rates of agricultural production and by providing adequate economic returns to producers» (7). Caporal and Costabeber (2002, 71) define agroecology as « a scientific approach aimed at the transition from current models of rural development and conventional agriculture to rural development and sustainable agriculture styles ». Food security concerns are related to food production and distribution. And social equity conveys the idea of intergenerational equity which « refers to the protection of the rights and opportunities of future generations to derive benefits from resources which are in use today » and intragenerational equity which « refers to the fair and equitable distribution of benefits from agriculture among and between countries, regions or social groups » (Smit and Smithers, 1993, 7). The selected books and articles below are good examples of the literature on the subject.

1. In the volume titled ***Agricultural Sustainability: Principles, Processes, and Prospects***, **S. Raman** reviews the evolution and contextualization of sustainable farming and explain how we can learn from past experiences, in order to gather knowledge for future management actions as well as for political, social, economic and ecological actions aimed at the achievement of sustainable agriculture. This volume deals with sustainability at the global level. It elucidates agriculture's history and contextualizes the growth of sustainable farming. The author addresses some concerns about global challenges, such as rural livelihoods and its future sustainability. The book's structure is very simple and easy to understand. It is divided into three parts. Part 1 analyzes the evolution of the sustainability's concept. Agricultural systems around the world are compared to demonstrate that sustainability is context-based and that, consequently, it is difficult to elaborate a global unique viable model. Part 2 concerns the operationalization of sustainable agricultural

practices. It discusses the importance of different resources for the promotion of sustainability, such as natural capital (energy, soil quality, water and biodiversity), economic capital and social capital. It proposes means to promote sustainability, highlighting the relevance of monitoring the systems' sustainability levels to guarantee the conservation of natural resources. Finally, the third part is devoted to the study of the necessary elements to operate the transition from mainstream farming to sustainable farming. The author analyzes the different challenges of implementation as well as the diverse models of sustainability and he discusses the « future » of sustainable agriculture based on international documents.

2. The volume by **D. Van Dam**, **M. Streith**, **J. Nizet**, and **P.M. Stassart**, titled ***Agroécologie : entre pratiques et sciences sociales***, is most useful for anyone looking to expand his or her knowledge on the agroecology movement, including the origin of the concept, its history, its multiple definitions and its several approaches. The book is organized into three parts: the first part is devoted to the study of relevant organizations and institutions regarding the implementation of sustainable farming. The second part is dedicated to economic and territorial issues such as subsidies and economic potential of organic farming. Finally, the third part concerns the importance of the social actors in the transition from mainstream agriculture to agroecology based agriculture. The volume also provides a global view of sustainable agriculture through the analysis of different case studies concerning agroforestry in India, organic agriculture in France, participatory actions in Brazil and food purchasing groups in Belgium.

3. Another interesting study to deepen one's knowledge on agroecology principles and sustainable agriculture from a holistic point of view is the volume edited by **P.J. Bohlen** and **G.House** titled ***Sustainable Agroecosystem Management: Integrating Ecology, Economics and Society***. It includes 17 interdisciplinary articles. Overall, the volume lays out important criticisms of conventional agricultural practices based on reductionist principles. It points out the unsustainable relationship between population growth and the environmental externalities generated by the global industrial farming production. By demonstrating the differences between conventional farming and agroecology based farming, it highlights the importance of adopting holistic practices. As explained by **W. Bland** and **M. Bell**, authors of Chapter 8, « a more holistic approach to the integration of farming and ecology will better promote nutrient recycling, biological pest and disease control, pollination, soil quality maintenance, water-use efficiency, and carbon sequestration » (p. 188). In the last chapters, the authors present the challenges and benefits of adopting multifunctional agroecosystems through some interesting case studies. The volume stresses the importance of ecosystem based agriculture, where nature is the measure.

4. Despite the fact that this is not a very recent study, the compilation by **C.A. Edwards**, **R. Lal**, **P. Madden**, **R. Miller** and **G. House** of 40 articles in the volume titled ***Sustainable Agricultural Systems*** is a very good introduction to sustainable agriculture research. While the work focuses on the U.S. reality, it nevertheless presents a good overall vision of sustainable agriculture around the world. It recalls the history of sustainable agriculture, presents various definitions of the term, and explains and illustrates the major challenges on implementing sustainable farming practices. Moreover, it demonstrates the important role of research centers in achieving international goals related to sustainable agriculture. It also clarifies the different farming practices considered to be sustainable and stresses the importance of adopting integrative approaches. Finally, the authors analyze the role of policy and economics in achieving low input agriculture as well as the ecological repercussion of sustainable farming practices. Multiple case studies in the book show that these practices can lead to the improvement of water quality, and contribute to the fight against soil erosion and the improvement of human health.

5. In ***Integrated Assessment of Health and Sustainability of Agroecosystems*** **T. Gitau**, **M.W. Gitau**, and **D. Waltner-Toews** make an important link between human health, well-being and agricultural sustainability. This book proposes several practical tools for sustainable rural development research, such as relevant term definitions, the study of ecologically based system theories, the adoption of adaptive integrated approaches to sustainability and the elaboration of health and sustainability indicators, developed both by the community and by a group of researchers. Although the focus of the book is on smallholder agriculture in central Kenya, it presents a wider perspective that can be applied to agroecosystems in different parts of the world. The use of indicators provides an objective assessment of sustainability, providing a monitoring mechanism that could guarantee a greater degree of health for agroecosystems. The book also stresses the importance of community participation in the decision making process.

6. The publication by J**.A. McNeely** and **S.J. Scherr** titled ***Ecoagriculture: Strategies to feed the world and save wild biodiversity*** is a complete manual on the implementation of sustainable agricultural practices as it schematizes the main problems regarding the transition from mainstream to an ecological agriculture, the necessary institutional changes, the different approaches to solving these problems and the various practical experiences around the world. The authors design creative integration strategies for biodiversity conservation goals and agriculture targets in order to satisfy the growing human needs. Its aim is to demonstrate that mainstream agriculture methods are obsolete and to put forward instead elaborate mechanisms to enable the development of agricultural methods which are economically productive, environmentally sustainable and socially balanced. The authors rely on the concept of « ecoagriculture » which means land use systems deliberately created to increase food production and farmers income while conserving wild biodiversity and ecosystem services. The work is divided into three parts: the first part examines the global impact of agriculture on biodiversity and the importance of biodiversity to agriculture. It also analyzes the relationship between agriculture and human well-being, discussing possibilities of reducing rural poverty. The second part concerns opportunities to integrate biodiversity conservation goals into rural development goals with a special emphasis on the ecosystem approach. The authors present several case studies from around the world on the successful implementation of ecoagriculture practices. The third and final part examines the institutional changes required to promote ecoagriculture. It deals with policy changes, market incentives, supportive institutions and mechanisms of knowledge dissemination.

7. For an interesting introductory reading about agrobiodiversity one can turn to the volume by **J. Santili** titled ***Agrobiodiversidade e Direito dos Agricultores*** as it discusses the relation between human and agriculture, the link between agrobiodiversity, law and farmers' rights. Although its focus is on the Brazilian reality, it also conveys more general information about the subject. The author associates socio-cultural diversity and agricultural diversity, explaining that agrobiodiversity essentially is a product of human's intervention on the ecosystem and that farmers have a leading role in its conservation. Thus, she considers agrobiodiversity as a cultural and biological heritage. The work enumerates several methods of agrobiodiversity conservation both *in situ* and *ex situ*. Furthermore, taking an interdisciplinary approach, the author discusses the concept of agrobiodiversity and its connection with food security, nutrition, health, environmental sustainability, climate change and biofuels. Important issues are addressed, such as the intellectual property of seeds and agricultural improvement. In this context, the author highlights the farmer's rights regarding the use of plant genetic resources. Finally, the book proposes new legal instruments for the protection and enhancement of agricultural biodiversity and the empowerment of farmers' rights.

8. If one wants to explore in detail the three dimensions of agriculture sustainability (social, economic and ecological) and to learn more about different compatibility strategies between agricultural production and environmental protection, he or she would do well to read the volume titled ***Agro ressources et écosystèmes: enjeux sociaux et pratiques managériales*** by **B. Christophe** and **R. Perez**. The authors aim to respond to this fundamental question: can the development of agricultural production be compatible with environmental protection goals? Thus, the authors examine the compatibility between the economic, social and ecological goals of farming. Tools and practices of environmental management are proposed, such as: the « savoir » (knowledge) or technological « savoir-faire » (knowhow); institutional mechanisms aimed at the internalization of negative environmental externalities generated by the actors' activities; and the social capital existing within the ideological and cultural relational network that composes the social fabric. The authors note that the ecosystem status and the conditions of farming production differ a lot from place to place. Thereby, the articulation of agricultural and environmental policies cannot be the same, for instance, in the European Union and in southern countries. However, despite these differences, some common crucial points can be identified: the important role of social, human, ecological and economic capital; the value of connectivity and multilevel governance of socio-ecological systems that takes into account the complexity of the environment; and the leading role of society, its behavior, values system and organizational methods.

9. The aim of the book by **M. Falque**, and **H. Lamotte**, titled ***Ressources agricoles et forestières: droit de propriété, économie et environnement***, is to explore which economic, legal and social instruments could support the adoption of sustainable farming practices. All articles come with English and French summaries. This facilitates the handling of the book. Based on the fact that several protection and management policies are founded on regulatory approaches aimed at limiting or controlling agricultural and forestry activities, the authors ask some crucial questions such as: could economic instruments be used as alternative instruments (instead of command-and-control) to promote sustainable agriculture management?; what is the role of contractual arrangements, payments for ecosystems services and environmental servitude mechanisms in promoting sustainable agriculture? The purpose of the book is to recommend changes to the legal, economic, political and social institutions in order to improve economic and environmental performances in agriculture while protecting individual freedom and public interest. Alternative solutions to protect and manage agricultural resources are presented by authors from different parts of the world. The book is divided into two parts. The first part deals with environmental issues and describes the evolution of agricultural and forestry policies (farming innovations, European Common Agricultural Policy, sustainable forest management mechanisms, agrochemicals, water use, colony collapse disorder). The second part stresses the importance of economic instruments and property rights in implementing sustainable farming practices (examples from China, Central and Eastern Europe, France, India, United States, Mediterranean Countries and Brazil).

10. The article by **M. Monteduro**, ***Environmental law and agroecology: Transdisciplinary approach to Public Ecosystem Services as a new challenge for environmental legal doctrine***, is a very important one to adequately understand the legal challenge of implementing a transdisciplinary approach that takes into consideration agriculture's multi-functionality. Moreover, it is a crucial reading to recognize the need to elaborate rural legislation based on ecological principles. The author explains the transition of agriculture, from mono-functional (commodities production to private actors and remuneration of farmers) to multifunctional farming (idea of ecosystem public services). He also explains

that the law must accompany this transition in order to implement systemic and holistic approaches to ensure the link between the environment and agriculture. The author asserts that in order to introduce agroecology principles into the « legal world », it is necessary to overcome the distinction between rural law and environmental law. Hence, he stresses the emerging need of elaborating a legislation specially focused on sustainable agricultural ecosystems that takes into account different types of ecosystems according to the different ecological classifications.

References:

Boulding, K. E., What do we want to sustain? Environmentalism and human evaluations. pp. 154-164 *in* Redclift, M. (ed.). Sustainability: Critical concepts in the Social Sciences. Vol. II., (2012) Routledge: London and New York.

Caporal, F. and J.A. Costabeber, Análise Multidimensional da Sustentabilidade: Uma proposta metodológica a partir da Agroecologia. Agroecologia e Desenvolvimento Rural Sustentavel, (July, September, 2002). Porto Alegre, v. 3, n. 3.

Gitau, T., M.W. Gitau, D. Waltner-Toews, Integrated Assessment of Health and Sustainability of Agroecosystems, (2008) CRC Press: London and New York.

Marsh, J. S., The policy approach to sustainable farming systems in the EU. (1997) Agriculture, Ecosystems and Environment 64, no.2, p. 103-114.

Sartori, S., F. Latronico, and L.M.S. Campos, Sustentabilidade e Desenvolvimento Sustentável: uma taxonomia no campo da literatura. Ambiente & Sociedade. (January, March, 2014). São Paulo, v. XVII, n. 1, p. 11-22.

Smit, B. and J. Smithers, Sustainable Agriculture: Interpretations, Analyses and Prospects. (1993) Canadian Journal of Regional Science/Revue canadienne des sciences régionales, XVI:3, p. 499-524.

WCED (World Commission on Environment and Development- also known as the Brundtland Report, « Our Common Future » (1987) Oxford University Press.

Yunlong, C. and B. Smit, Sustainability in Agriculture: a general review. Elsevier, (1994) Agriculture, Ecosystems and Environment 49, p. 299-307.

International Documents:

1- The *International Convention for the Protection of New Varieties of Plants*, 1961. Available at: http://www.upov.int/upovlex/en/upov_convention.html.

2- The *Convention on Biological Diversity*, 1992. Available at: https://www.cbd.int

3- *United Nations Framework Convention on Climate Change*, 1992. Available at http://unfccc.int/2860.php

4- *The Agreement on Trade-Related Aspects of Intellectual Property Rights*, 1994. Available at: https://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm

5- *The Agreement on Agriculture from de Uruguay Round GATT negotiations*, 1995. Available at: https://www.wto.org/english/tratop_e/agric_e/ag_intro01_intro_e.htm

6- *The International Treaty on Plant Genetic Resources for Food and Agriculture*, 2001. Available at: http://www.planttreaty.org/content/recent-progress

Further readings:

Barraclough, S. *et al.*, Rural Development and the Environment : Towards ecologically and socially sustainable development in rural areas. (1997) United Nations Research Institute for Social Development: Geneva.

Braun, R,. Novos paradigmas ambientais : Desenvolvimento ao ponto sustentável. (2008) Petrópolis, Editora Vozes: Rio de Janeiro.

Glaeser, B., Environnement et Agriculture : l'écologie humaine pour un développement durable (1997) L'Harmattan : Paris.

Hester, R. and R. Harrison, (Ed.), Sustainability in Agriculture, (2005). Issues in Environmental Science and Technology, vol. 21. RSC Publishing : Cambridge.

Leff, E., Agroecologia e saber ambiental. (January, March, 2012). Agroecologia e Desenvolvimento Rural Sustentável, Porto Alegre, v. 3, n. 1, p. 36-51.

Martin, P. and N. Gunningham, Improving governance arrangements for sustainable agriculture: Groundwater as an illustration. (2014) Australian Journal of Environmental Law, v. 1, p. 5-23.

Neumayer, E., Weak versus strong sustainability: exploring the limits of two opposing paradigms. 2nd ed., (2003) Edward Elgar, Cheltenham: UK.

Richli, P., (Dir.) Agriculture and the requirements of a sustainable development. XXVI European Congress and Colloquium of Rural Law. (2013) L'Harmattan : Paris.

Schaller, N., The concept of agricultural sustainability. Elsevier: Agriculture, Ecosystems and Environment, 46, p. 89-97.

Snapp, S. and B. Pound, Agricultural Systems : Agroecology and Rural Innovation for Developpement, Elsevier, (2008): Burlington, San Diego and London.

Thrupp, L. A., Cultivating diversity: agrobiodiversity and food security. (1998) World Resources Institute: Washington DC.