



Agronomía Colombiana

ISSN: 0120-9965

agrocolfabog@gmail.com

Universidad Nacional de Colombia
Colombia

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Agronomía Colombiana, vol. 32, núm. 1, 2014, pp. 130-137

Universidad Nacional de Colombia
Bogotá, Colombia

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Reappraising the multiple functions of traditional agriculture within the context of building rural development investigative skills

Revalorización de las múltiples funciones de las agriculturas del campesinado en el contexto de la construcción de competencias investigativas en desarrollo rural

Álvaro Rivas G.¹ and Heimar Quintero V.²

ABSTRACT

The productivist and reductionist vision of industrial agriculture in the twentieth century prevented the analysis of the other multiple functions of traditional agriculture, such as those corresponding to the ecological and cultural dimensions. In the current rural crisis, which entails food insecurity, environmental uncertainties, deterioration of the social fabric, a context lacking rural educational (extension) proposals and impaired quality of life, to name a few, it is necessary to reassess traditional agriculture in order to generate strategies that are capable of providing strategic answers to the problems in question. The current multifunctional agriculture (MFA) paradigm allows agricultural research in different world regions, addressing comprehensive economic aspects, protection of commons, actor-centered focus and public policy formulation. This article presents the current modern research contributions that, in the framework of the project: Rural Societies, Economy and Natural Resources integrating rural development skills, (Sociedades Rurales Economía y Recursos Naturales integrando competencias para el desarrollo rural - SERIDAR, which is part of the Alpha III program of the European Commission) and reveals and reappraises other functions of traditional agriculture that warrant investigation. In this way, the Universidad Nacional de Colombia contributes to the development of appropriate research skills by integrating post-graduate students in transdisciplinary research with local knowledge networks. We hypothesized that farmer adaptations contain practical and technical strategic guidance for the protection of common goods (soil, biodiversity, water, etc.) and the strengthening of the social fabric (knowledge and culture). With the reappraisal of the multiple functions of traditional agriculture and their upgrading in the context of post-industrial cultures, it is possible to build strategies that are capable of responding to the uncertainties produced by the global markets of food, land and technology, the reductionist knowledge systems and the environment.

Key words: traditional farming, regional development, regional agricultural policy, rural development.

RESUMEN

La visión productivista y reduccionista de la agricultura industrial en el siglo XX impidió analizar otras múltiples funciones de la agricultura tradicional (eco-sistémica, cultural). Frente a la actual crisis que atraviesa la ruralidad: Inseguridad alimentaria, incertidumbres ambientales, deterioro del tejido social, descontextualización de propuestas educativas rurales -extensión-, deterioro de la calidad de vida, etc. Se requiere revalorizar la agricultura tradicional campesina para generar estrategias que den respuestas a los problemas en mención. El actual paradigma multifuncional de la agricultura -MFA-, permite realizar investigaciones agrícolas en diferentes regiones del planeta que aborden aspectos económicos incluyentes, protección de bienes comunes, centralidad en el actor y formulación de política pública. El presente artículo presenta aportes de investigadores en la modernidad tardía y que en el marco del Proyecto Sociedades Rurales Economía y Recursos Naturales integrando competencias para el desarrollo rural, SERIDAR, (Del programa Alfa III de la Comisión Europea) evidencia y revaloriza otras funciones de la agricultura tradicional para investigar. De esta manera La Universidad Nacional de Colombia contribuye en competencias investigativas integrando estudiantes de postgrado en investigaciones transdisciplinarias con redes de conocimiento local. La investigación formula la hipótesis que en las adaptaciones realizadas por los agricultores en prácticas y técnicas se encuentran orientaciones para construir estrategias de protección de los bienes comunes (suelo-biodiversidad-agua-etc.) y fortalecimiento del tejido social (conocimientos-cultura). Con la revalorización de las múltiples funciones de la agricultura del campesinado y con su actualización en los contextos de las culturas postindustriales se pueden construir estrategias para responder a las incertidumbres propiciadas por el ambiente, los mercados globales de alimentos, tierras, tecnologías y sistemas reduccionistas de conocimiento.

Palabras clave: agricultura tradicional, desarrollo regional, políticas regionales de agricultura, desarrollo rural.

Received for publication: 10 October, 2013. Accepted for publication: 19 March, 2014.

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Introduction

The academic disciplines have only expanded their acknowledgment of the services provided by agriculture to human societies in recent decades. This notion has evolved from the single recognition of the selection and domestication of plants and animals in the processes of sedentary lifestyle and culture development in different parts of the planet, highlighting the role of local agricultural methods in the current responses that communities are giving to the barbarian land, water, labor, credit, technology, knowledge and other market deformations brought about by modernity. The latter have specifically resulted from the industrial and post-industrial colonization of rural areas and its activities, from the global standardization of food regimes, and from the agglomeration of the population in urban biomes.

In this context, the main objective of this paper is to document the importance and validity of the multiple functions of traditional agriculture as generators of new developments in the environmental, socio-cultural and technical-productive dimensions of sustainability. This appraisal is the starting point for reassessing the necessary academic skills for addressing the rural world in modern times.

This text begins by paying tribute to the pioneering contributions of Mexican ethno-agronomist Efraín Hernández Xolocotzi in the 1980s (Hernández, 1977). Then, it addresses the various functions of traditional agriculture, namely production, environmental service delivery and specific competence education; it highlights the political-academic approaches to the paradigm of multifunctional agriculture (MFA) from the perspectives of economics, land use, actor-oriented focus, and public policy development; and emphasizes that the current research approach demands new conceptual and methodological frameworks such as those provided by transdisciplinarity and the Theory of Complexity. Finally, it documents the reassessment of traditional agricultural and territory dwelling methods within the construction of rural development research skills, which was carried out in two postgraduate courses taught at the Universidad Nacional de Colombia, Bogota.

Multiple traditional agricultural methods

Traditional agriculture has many functions: provisioning not only food for humans and domestic and wild animals, but also fibers for clothing and wood for shelter and housing; producing objects and tools such as wooden mills and others; modeling, transforming and adapting the

environment (soils, climate, vegetation, animals, microorganisms) to human needs; sharing oral knowledge about plant and animal populations, land, climates, practices and techniques, and ways of working and living; and rearranging worldviews, nutrition, health care and customs (Hernández, 1988).

Thus, based on a broad range of resources and practices and on multiple land utilization patterns, the productive and extractive activity of the rural household exploits the spatial heterogeneity imposed by the complementariness and integration of cropping, livestock, and forestry uses (González and Toledo, 2011).

To carry out the appropriation of local resources, a cognitive system must be available that harbors an adequate body of perceptions, signs, symbols and notions (Toledo and Barrera-Bassols, 2008). In this sense, farming cultures mingle the physical and metaphysical worlds. Through oral narrative and cultural memory, they record phenomenological features of the territory (lands, plants, animals, climate, topography) and harbor a broad corpus of collective, local, holistic and diachronic, knowledge (Toledo and Barrera-Bassols, 2008). Traditional farmer worldviews result from developments that have been practiced for decades and adjusted to improve natural resource utilization. They attempt to explain cosmic phenomena, which provides the basis to build not only mechanisms for generating and validating new knowledge and practices, but also systems intended for the conservation, exchange and transmission of ancestral knowledge, in order to produce, prepare, store and preserve goods (Hernández, 1977).

Clear and sufficient evidence has shown the deep knowledge kept by agrarian cultures about constellations, animals, plants, food processing, fungi, rocks, water, lands, landscapes, geo-physical, biological and ecological processes, soil movements, hydrological and climate life cycles, flowering, fruiting, germination, estrus and nesting periods, ecosystem recovery (ecological succession) and landscape management (Toledo and Barrera-Bassols, 2008; Rivas, 2004; Estrella, 1988; Patiño, 1964; Cano *et al.*, 2010; Leff, 2005; Pájaro, 2009).

On these grounds, recognizing the bio-cultural memory of humanity allows for keeping long-term historical records that bring about the possibility of unveiling technical, economic and epistemological limits and biases of modernity and displaying civilization-scale solutions to the current problems of Society (Toledo and Barrera-Bassols, 2008). In fact, new planetary life challenges demand shifting from

the strictly productivist function to a paradigm that is capable of reorganizing agricultural practices through their multiple functions, presenting new technical validation solutions and building new ways of learning and developing agricultural practices.

Since the 1992 Rio Summit, the paradigm of multifunctional agriculture has been strengthened in scientific and political circles. According to the FAO, MFA not only contributes to rural development, income improvement and livelihood strategies in developing countries, but also generates environmental externalities that constitute a solid background when it comes to addressing developmental challenges in food security, poverty alleviation, social inclusion and cultural heritage (Renting *et al.*, 2009).

For neo-institutional economics, agriculture also shapes the landscape and provides environmental benefits such as soil conservation, sustainable management of resources, preservation of biodiversity and viability of some rural areas (Milone, 2009).

The MFA paradigm should provide answers to the problems of unsustainability that are implied in industrialized agriculture: How to approach rural landscape in modern studies? What is the resilience of rural communities in face of the uncertainties of environmental changes? What are the causes of the new population reconfiguration of rural and urban areas (migration, exclusion, violence, rural education)? How to drive rural worlds close to urban life? How to redefine and reappraise the rural and traditional realms in the framework provided by the new conceptual, methodological and empirical benchmarks of the XXI century? How to involve new actors (consumers) in the socio-technical network of the agri-food system? What are the social and ecological effects of economic policies (global, neo-institutional, mixed economy, etc.) on the agri-food system? What is the role of the state in regulating, encouraging or discouraging rural development? How to potentiate local knowledge systems to involve them in the design of strategies for the adoption of and adaptation to technological innovations? (Woods, 2012; Ploeg, 2010; Toledo and Barrera-Bassols, 2008; Naredo, 2010; Bejarano, 2011). All these are certainly troublesome and benchmarking questions when it comes to rural studies in the postindustrial culture.

Transition to multifunctional territories

In the new economic and productive dynamics of globalization, the territory emerges as a reference framework for

public policy due to the conceptual and practical exhaustion of the regional approach, the lack of environmental sustainability and development proposals, and the questioning of the economic activity sector dynamics (agriculture, industry, trade, services, etc.) (Schneider, 2004).

The Colombian cultural, social, political and ecological heterogeneity allows for considering the coexistence of different systems when it comes to redesigning the territory. Young and female laborers are abundant, there are unique conditions for tropical agriculture, environmental services offer suggestive opportunities, and local knowledge can contribute to the development of a new technological paradigm.

The functions of the territory are not only related to primary production. They include food quality and security, environmental protection, conservation of biodiversity, contribution to social and economic cohesion in rural areas, and landscape preservation (Labarthe, 2009). The MFA paradigm constitutes a new vision of public intervention intended to correct market failures, provide necessary public goods, and generate other positive externalities through joint production processes (Atance *et al.*, 2001). MFA is a response to the collapse of the productivist agricultural paradigm, which has generated undesirable socio-environmental damage (land desertification and contamination of the water table, among others); health and food crises (mad cow disease, dioxin contaminated chicken, and residual chemicals, among others) and rural exclusion.

At first glance, multifunctionality can be restricted to multi-activity within an agro-industrial model. But on the other hand, it can be defined as post-productivist, looking toward other land functions; or as part of a sustainable rural development paradigm in which agricultural production is closely related to health and human welfare in rural areas and an economy that is a means, not an end, in itself (Marsden and Sonnino, 2008; Morgan *et al.*, 2010). The core strength of multifunctionality corresponds to environmental protection and farm and rural community health, all of which certainly contribute to the paradigm of sustainable rural development (Wilson, 2008; Morgan *et al.*, 2010; Rivas *et al.*, 2011).

Investigative approaches to multifunctional agriculture

Market regulations. The debate prioritizes the economic aspects of MFA, together with government policies intended for structuring the assets generated by agriculture,

namely private or public goods, and positive or negative externalities. The conceptual framework arises from classic economics through price fixation and valuation of public goods and positive (green) or negative externalities. The definition of the functions of agriculture through market dynamics is mainly addressed from institutional, patrimonial and political economics or economic sociology. The role of the government is to reconcile the individual interest of the farmer with that of the community. The instrument of intervention is contractual in nature and it acts by associating each farmer with the state. The economic approach to MFA prevents the visibility of other non-productive, intangible and unmarketable functions of the agriculture of public goods (biodiversity, landscape, etc.), such as food quality, food self-sufficiency of rural communities, social cohesion, education and rural welfare, among others.

Land use approach. Focused on the spatial assessment of the territory, this approach is influenced by scientific disciplines such as landscape conservation, geography, land planning and utilization, and regional economy. This particular approach to MFA investigates a broad range of landscape elements such as natural resource use, adaptation and mitigation of climate change.

In this category, there are four types of studies: descriptive, predictive, exploratory and design analyses, each of which has its own data collection and availability systems, knowledge levels and result presentation scales. Land use analysis is often initiated with spatial classification maps to the nearest level of detail depending on the availability of databases documenting land use and supply input per unit area on the farm, sub-basin, basin and region levels. Since land use intensity accounts for landscape impacts through biotic and non-biotic environmental indicators (Renting, 2009; Verburg *et al.*, 2006), it allows for assessing sustainability in the medium and long terms.

Exploratory studies are carried out considering Agronomy and Production Ecology. Comparative studies emphasize land use, but do not assume the decision-making process in-depth.

Additionally, by studying nature reserves and urban and archaeological parks, the land use approach integrates the sustainable use of agriculture by establishing buffering zones, thus articulating production and recreation, protection of biodiversity (migratory and endemic species), conservation, contemplation and scenic beauty (Verijken, 2002).

Actor-oriented approach (decision-making processes and social construction practices, routines and innovations)

The disciplines that support this type of study are Rural Sociology and Agricultural Economics. The actor is not just the person who knows farming practices, but all those that make up the socio-technical network (novelty dissemination agents, supply providers, traders, etc.). In addition to integrating goods and/or service consumers concentrated in urban settlements, this approach allows for the visibility of services that are not included in food marketing, such as public goods, scenery, biodiversity, water supply and tourism; or products with territorial attributes (e.g., ecological quality food, wild edibles, handicrafts and products with environmentally friendly attributes or any cultural or geographical origin-designation). As can be seen, the functions addressed in this approach are not directly related to goods or services inscribed in market dynamics, but to non-marketable public benefits, such as quality of life, food security and autonomy, reproduction of local agricultural knowledge and practices, social cohesion, cultural roots, etc.

This particular MFA approach has enabled a better understanding of the different actors' rural income; their multiple time allocation methods, such as full and part-time work; the way they combine productive (food cropping or increased value added) and non-productive strategies (biodiversity conservation, ecotourism, rural education). Also, in this sense, the multiple motivations for doing agriculture (cultural identity, conservation, family, spiritual and lifestyle reasons) can only be understood from a multifunctional perspective not having the "market" as the only driving force of rural change (Ploeg and Roep, 2003; Ploeg, 2011).

The main cornerstones of the actor-oriented MFA perspective are: 1. Understanding cultural repertoire diversity; 2. Conceptual recognition of the actors in their dimensions of experience knowledgeable and systematization; 3. The influence of human and nonhuman relationship networks on social practices. 4. The intertwining of the "projects" with social practices, which penetrates human, symbolic and geographical spaces. The combination of ecological, demographic, market, economic, political and socio-cultural changing conditions generates different business patterns, management styles, cropping systems and production levels. As farmers adapt to the new production strategies and needs of the rural family, knowledge is transformed into responses to intentions, opportunities and changing

circumstances. The farmer is an active strategist who faces problematic situations, processes information and gathers necessary items to operate the farm (Long, 2007; Ploeg, 2010).

The new MFA paradigm ought to provide a theoretical and methodological regulatory framework for understanding the joint production processes of nature and society, in order to attain sustainability in agriculture in regional geographic contexts (Ploeg, 2010; Milone, 2009; Toledo and Barrera-Bassols, 2008).

The role of multidisciplinary, transdisciplinarity and complexity theory in new agricultural multifunctionality studies

Compartmentalized disciplinary approaches have been associated with university institutions since the nineteenth century. Their specialized knowledge does not evaluate the whole, nor does it respond to the ecological, energetic, nutritional, financial and governmental challenges posed by the crisis of the productivist global development model.

In this context, the principle of complexity helps to solve the current rural problems, since human sciences are not aware of the physical and biological nature of human activities. The natural sciences too are not aware of their cultural, social and historical involvement. As a result, they both tend to ignore the hidden principles that guide either phenomenon. Complex thinking demystifies univocal rationality and validates the insurgency of a way of thinking that gets rid of all essentialist or substantial foundation of reality and understands it as relative, asymmetric, and contextual amidst cognitive praxes, thus becoming impossible to tie along the borders between different objects of study (Márquez and Díaz, 2011).

Thus, rural science skill training should assume the contribution of human activities in rural areas to environmental problems with deep epistemological commitment, since this problematic certainly constitutes a colossal threat to the survival of the planet and the human society on it (Toledo *et al.*, 2009; Lovelock, 2007; Hinkelammert and Mora, 2003). Since the eighties, multidisciplinary studies have expanded the horizon of inquiry of rural system analyses, introducing the concepts of farming systems (agroecosystems), energy balances, genetic erosion, preservation of agro-biodiversity, ethno-agriculture, food, soil and water pollution, social and environmental impacts of green revolution technologies, theory of rural communication and information transmission networks, and agro-ecological,

cultural and social functions, among others (Hernández, 1977; Toledo and Barrera-Bassols, 2008; Freire, 2007; Estrella, 1988; Hart, 1982; Conway and Pretty, 1991; Pimentel *et al.*, 1990; Martínez and Shlupmann, 1997; Long, 2007).

Currently, no discipline can sufficiently meet and benchmark the problem alone (Morin, 1995; Motta, 2002). To articulate the disciplinary archipelago, it is necessary to interrelate, rebind, rethink and consider the logos, ethos and pathos in the study of nature and society, so as to care about and understand Gaia (Boff, 2004; Lovelock, 2007). The transdisciplinary effect causes a breakdown of the principles of uncompromising objectivity and reification of the subject by the object. Transdisciplinarity allows for opening reality as a system affected by multiple methods of thought and interpretation (Márquez and Díaz, 2011).

Transdisciplinarity articulates knowledge fields and branches, scientific and traditional approaches, and western and non-western cultures. It not only transfers concepts, methods, terms and even bodies of theory, but it also complements and articulates several realities (Leff, 2005). This particular approach attempts to understand the multiple dimensions of reality from the unity of knowledge and the relativistic of the disciplines. It considers reality as an open unit encompassing the subject, the object and the sacred. This new way of understanding reality articulates the inner and outer universes by linking people, facts, images, representations, and action and knowledge fields; thereby allowing for the rediscovery of the Eros of learning throughout life (Motta, 2002; Nicolescu, 2007).

Experiences currently under development in the Faculty of Agricultural Sciences of the Universidad Nacional de Colombia

In two postgraduate courses at the Universidad Nacional de Colombia (*i.e.*, Rural development strategies and sustainable management of the territory. ii. Rural Development and Agroecology), we are currently undertaking an investigative skill building process in which the contribution of the multiple functions of traditional agriculture to rural development processes is reevaluated. Below, we describe the courses in question according to the model under which they are conducted at the institution.

Rural development and sustainable land management strategies

The course represents the cultivated fields embedded in ecological, cultural, historical, geographical, economic and social contexts. On this basis, it develops sustainable

management proposals rooted in multidisciplinary approaches for farming landscapes. Students become familiar with methodologies that introduce them to the complex world of rural life, so as to understand the rationale of their decisions and actions in rural environments. Research work undertaken by the students explores mechanisms of integration between the University and the Community, generating mutually beneficial feedback loops.

Course objectives

Formulating rural development strategy drafts that allow for building the way towards the social, economic and environmental sustainability of the territory, taking either the rural district or the watershed as the unit of analysis.

Diagnosing the reproducibility of a rural system through the use of environmental, institutional, labor, eco-tourism, income and expense, worker feature, and total land use (available land use allocation) balances.

Preparing a participatory research plan that allows for analyzing the case study of a rural system.

Rural development and agroecology

The course attempts to familiarize the students with tools that set the rural landscape in the contexts generated by the human dwelling methods of the tropical Andean anthropo-biome. Although these settlements tend to mimic temperate zone lifestyles, they are certainly adapted to prevailing conditions above 1,000 m a.s.l. in the Colombian mountain ranges.

The course reappraises and complements the agroecology rural development and rural space urban space couplings in the context provided through the formulation of pluralistic, flexible and dynamic rural development strategies, so as to move from productive monofunctionality to the multifunctionality of rural territories.

Course objectives

Developing skills in preparing research tools that are capable of integrating the agroecological perspective to the design of Rural Development strategies.

Promoting participatory and collective analysis processes for the discussion and development of solutions to the environmental, ecological, social, cultural and economic problems of agricultural systems, in order to design effective sustainable development strategies.

Encouraging students to ask questions and formulate hypotheses, so as to further the study of specific rural problems, thus bringing the university to rural communities

Methodology of the courses

In the first place, complementing the keynote lectures of the professor with the active involvement of the students in the development of research competencies holds an important place within the methodological guidelines of both courses. In this sense, the research tool building process promotes the selection of relevant information and sets operational concepts in motion.

The systemic representation of the property, which addresses the sub-systems that make up the farm (land x land cover, land x land use, water body x land cover, water x uses, extended family x farm), the conflict-cooperation relationships among sub-systems or the general risk inventory of a given rural area not only helps to test and refine the research tools used for that purpose, but also sensitizes the experts by moving them from the externality of observation into the day-to-day reality of rural life.

Representing research progress through maps, inventories, and economic and energetic balances; as well as plotting and tabulating the information on corresponding instruments helps to understand the unfinished nature of academic products and to listen empathically to comments, annotations and interventions enunciated by fellow students and by the teacher.

In the last module, the professor lectures on border or emerging issues aimed at a comprehensive intervention of the complex rural world.

Intercultural network for rural studies

To deal with multidisciplinary research involving local actors, the students integrate themselves into this network, whose criteria of incorporation are:

Reappraisal and documentation of traditional agricultures in different cultural contexts (Andean and coastal rural areas, Afroamerican and indigenous peoples);

Taking advantage of the presence of the Universidad Nacional de Colombia in different regions, in order to strengthen relationships with communities;

Evaluating different rural landscapes and/or biomes (Cauca and Magdalena inter-Andean valleys, piedmont and high

Andean regions, the Caribbean Coast, the Chocó biogeography, the Orinoco Plains, Amazonian Margins, Insular Colombia) to take them into account in the design of regional strategies or policies of rural development.

Local actors in the network are traditional and rural household members, indigenous and Afro-American people, rural producers and disseminators, supply and crop traders, consumers and non-consumers. Among them, certain individuals or groups become pivot points (porters or intermediaries) who facilitate or block the flow of particular types of information (Long, 2007).

Conclusions

The inventory of the unseen on traditional farms must be expanded not only within the production and plant collection function. The positive externalities generated by farm vegetation should also be listed. Plants capture atmospheric carbon to build roots, trunks and branches, protecting both soil life from the very intense midday temperatures and water in the root zone from evaporative climate forces, blocking the erosive force of raindrops, guiding the infiltration of water into soil depths, and making it ooze through surface currents.

Only the construction of tools and concepts resulting from the hybridization of multidisciplinary concepts and from the integration of academic interpretations with those of rural novelty developers in local communities will help remove the veil of the complexity of traditional agriculture praxis in the twenty-first century. This approach has the potential of strengthening the communities of local practitioners of this research method and enhancing novelty production. This, in turn, legitimizes the role of explorers who cross the boundaries of “their own” farming style to test the ways of other communities of practitioners in their homestead laboratories and listen with tolerance to the sayings circulating in influential communities.

But, shedding light on the complexity of local farming styles is also advantageous for the type of agriculture idealized by modern times: agro-industry and agribusiness. Learning through the sharing of knowledge with neighbors and distant traditionalists -with other ways of life, with Gaia- will allow specialized agricultures to become more flexible and to re-adapt and improve their resilience in face of the growing and threatening uncertainties generated by the monopolistic administration of food and raw material global markets and by the constant deepening of environmental, climate and human life dignity crises.

Acknowledgement

The authors wish to thank Efigenio Hernández for reviewing the text and to acknowledge the logistical support given by the European Union, Alpha III Program.

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