

Ethno Agronomy and Sustainable Community Development

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Abstract

Objective: The traditional agricultural systems have proven throughout history their relevance and sustainability, at one time they were considered inefficient, primitive, based on myths and not on scientific studies, however, their revaluation reappears today as an alternative to promote the development sustainable community through ethno agronomy. **Methods:** The study is a methodological proposal that uses ethno agronomy as a fundamental axis in the approach of sustainable community development strategies. The proposal arises from the need to have a methodological reference with an interdisciplinary approach that serves as a guide to the relevant actors in the promotion of this type of development. Ethno agronomy community development and social metabolism are used as a theoretical basis. **Findings:** The results highlight the possibility of analyzing reality through at least six dimensions: environmental, social, economic, cultural, institutional and technological. **Application:** The operation of the methodological proposal considers the following phases: Detection of problems, definition of lines of action and analysis of alternatives and it is concluded that the methodological proposal for the construction of sustainable community development based on ethno agronomy is valid only for a geographical context, social and cultural, on a specific spatial and temporal scale.

Keywords: Extensionism, Innovation, Management, Participation, Rural, Territory

1. Introduction

Since ancient times, man depends almost entirely from cultivation or harvesting of plants to meet their biological needs due to photosynthetic capacity, specific green plants, by which the inorganic material is transformed into organic compounds as are sugar, starch, fats, proteins, among others so that, frequently, the functions of agriculture are recognized in terms of the provision of food, fibers and other raw materials, the effect on their prices, the contribution of labor and capital and the constitution of a market for the consumption of non-agricultural goods. Although traditional agricultural systems have demonstrated throughout history their relevance and sustainability, at one time were considered inefficient, primitive, based on myths and not on scientific studies and, therefore, unworthy of any recognition or study. One of the causes of this situation has to do with the devel-

opment of the Green Revolution, where four main lines of “modernization” were recognized: mechanization, chemical fertilization, phytosanitary and hybrid seeds, “crushed” the traditional practices in agro systems.

For some years, another perspective emerged that considers agriculture as a provider of other non-economic functions, such as food security, the conservation of the environment and the rural landscape, and as something that contributes to the viability of rural areas by providing sources of occupation and favor a balanced territorial development. The call multifunctionality of agriculture refers to the specific properties of this productive activity and the fact that can generate various products and thereby contribute to the realization of multiple targets¹. In, conceives the multifunctionality of agriculture as a tool to increase the sustainability of a certain activity. Peasant society in the social sphere, is a community based on Multi-active and multifunctional family economy

where different people with non-farm jobs participate in community life and share his fate². Given the need to build conceptual frameworks that allow for consistent on relations between natural processes and social processes from a holistic or integrative perspective, social metabolism³, for purposes of this paper, analysis is considered as a useful tool. The metabolism between nature and society contains two dimensions or spheres: one material, visible or tangible and another immaterial, invisible or intangible. Let's review the first one. The social metabolism begins when the socially grouped human being's appropriate materials and energies of nature (input) and ends when they deposit waste, emanations or waste in the natural spaces (output). But between these two phenomena also occur processes in the "entrails" of society by means of which the appropriate energies and materials circulate, transform and end up being consumed. Therefore, in the general process of social metabolism there are three types of energy flows and materials: inflows, interior flows and outflows. The metabolic process is then represented by five phenomena that are theoretically and practically distinguishable: appropriation (A), transformation (T), circulation (C), consumption (Co) and excretion (E).

During the appropriation, human beings perform three basic types of intervention in natural spaces, each one of which impact or affect differently the ecosystems and landscapes that are the object of appropriation, and each of which ends up having a territorial expression or spatial. In the first case, the appropriation is made without

causing substantial changes in the structure, architecture, dynamics and evolution of the ecosystems and landscapes that are appropriated. This includes all known forms of hunting, fishing, gathering, and grazing, as well as certain forms of extraction and livestock by foraging in the original vegetation. In the second case, these are acts of appropriation where human action dismantles or disrupts the ecosystems that are appropriated, to introduce sets of domesticated or domesticated species, as is the case with all forms of agriculture, livestock, forestry of plantations and aquaculture. The main difference between these two modes of appropriation of nature is that: in the first case, ecosystems are appropriated without affecting their intrinsic or natural ability to self-sustain, self-repair and self-reproduce; in the second, the appropriate ecosystems have lost such abilities and require a fortiori external energy (human, animal or fossil) to maintain them. In the absence of human action, these "artificial ecosystems" are both regenerated and returned through the mechanisms of ecological restoration to the original forms from which they arose, or derive in bizarre, atypical and unpredictable forms. In the first case it is a "managed nature", in the second case of a "domesticated nature", or of a "non-colonized" and "colonized" nature. It should also be noted that under these two modes of use of nature activities can also be carried out that are harmful or benign from the ecological point of view: for example, a hunting or predatory fishing or not in the first case, or an agriculture or livestock destructive or organic or holistic type in the

Table 1. Endogenous development according to modes of appropriation of nature

Farmer	Agro-industry	Pos-peasant
Production for consumption	Market production	Natural resources in communal property regimes with access rules defined by traditional institutions.
Predominance of use value	Predominance of exchange value	Satisfaction of own needs and / or generation of products that have added value for interaction with the capitalist system.
Reproduction of producers and the productive unit	Maximization of the mass of profit and capital accumulation.	They raise the standard of living of their communities.
Based on ecological exchange (with nature)	Based on economic exchange (with the market)	There is mutual help and collective action as forms of reciprocity supported by their social organization.
Relationships sacred with nature	Secular relationships with nature	The purpose of this type of production is the satisfaction of needs, reproduction and / or expansion of their means of production.
		Production based on local knowledge and skills, and on the experimentation and adaptation of technology.
		Collective distribution of surpluses.
		Relationships sacred with nature.

second. In the last decades, the conservationist action that seeks the preservation or protection of natural areas untouched or in process of regeneration, has given rise to a third form of appropriation in which ecosystems are conserved for the purpose of protecting species, patterns and processes, whose maintenance is useful because it generates services such as the maintenance of biological and genetic diversity and local, regional or global climate, water harvesting, carbon sequestration, recreation, education, contemplation and scientific research. This third case is distinguished by human action being a kind of “non-action”, in which any act of extraction of goods from the object of appropriation is suppressed, which is sought to preserve or protect for its value as a provider of services. Rural communities are at the center of the socio-ecological intersection, as an entity tensed by the forces of nature and society. This tension results from the material exchanges (Table 1) that the community makes with nature (ecological exchanges) and with society (economic exchanges).

While much of the experimental sciences have taken relatively easily using ethno prefix to refer to the use of traditional knowledge as a source of knowledge (Ethno botany, ethno-medicine, Ethno-pharmacology) forming the ethno-sciences calls, agronomy has remained until the moment outside of this process. This fact is surprising not because agriculture is a human activity developed for over 10,000 years and, therefore, has accumulated a wealth of very numerous “knowledge”.

For the purposes of this work, ethnoagronomy is understood as a scientific field belonging to the group of ethno-sciences, focused on the systematization of the knowledge used by native and mestizo communities in the use of natural resources, particularly those applied to the production of food and basic satisfactions of rural communities, a field of study that in Western science corresponds to Agronomy. With this, we will be on the path that the search and systematization of the knowledge of peasant communities for their registration, evaluation and possible use in sustainable development proposals.

The task of ethno agronomy in the construction of proposals for the development of peasant communities, part of the diagnosis of natural, technological, cultural and knowledge resources that allow the approach to local productive resources, the vision and perspective of those involved and with it the participative construction of development alternatives that allow the competition of available resources and the commitment of those

involved, as a guarantee that supports the possibility of success of the proposal.

Therefore, ethno agronomy must carry out research on the complex corpus, cosmos, praxis, in the terms developed by author⁴, for Ethno-ecology, because, although due to the technological nature of Ethno-science, it can be interpreted that the point of interest The main one corresponds to the praxis, this cannot be separated from the set of knowledge (corpus) associated with that practice and the belief system (cosmos) that constitute the world-view of the study conglomerate.

Another element to consider will be traditional agricultural technology (TAT), which was defined as: ... those cultural elements emanating from the empirical knowledge accumulated by rural ethnic groups over thousands of years, in their attempts to use renewable natural resources through the agricultural, cattle, forestry and faunistic exploitations to obtain the anthropocentric satisfiers for their subsistence and social and economic development.

In order to delve into the issue of community development it is necessary to consider that in Mexico, rural communities generally, due to the poverty conditions in which they find themselves, are forced to carry out an intensive exploitation of their resources and to use in certain activities properties that do not have the adequate potential⁵. For this reason, it is considered that rural communities depend to a large extent on their natural resources, which demonstrates their importance to protect them, since they can operate as allies of biological protection and genetic diversity in situ⁶.

There is a close relationship between society and the environment, since both are subsystems that make up a global system and are mutually conditioned. The development potential of a community depends in large part on its natural resources. The conditions of resources attributed to certain elements of nature depend on empirical, technological and scientific knowledge, as well as on social priorities, in such a way that a matter considered “waste” can be transformed into an energy resource and, mineral can lose economic interest. Since, natural resources are the result of the interaction of nature and man, who pursues a specific purpose. It constitutes a functional and dynamic concept that responds to changing individual and social needs. Natural resources are the varied means of human subsistence that man obtains directly from nature.

According to by author⁷, community development is a social process and practice, which is found in the praxis,

social action, understood as a social technique to the set of practical and systematic rules whose procedures to be applied are translated in actions through which some aspect of society is modified and transformed. As any social technique relies on the scientific knowledge of the social and the theoretical-interpretative frameworks provided by the social sciences. Social action must be based on an ideology, philosophy or worldview, as it provides the guiding principles that concern the way in which they must be organized and society must function.

Community development proposals that include knowledge and community resources, as well as a typology of community producers according to their production specialties and access to resources, mainly land and labor, is fundamental for the construction of intervention proposals.

In this sense, the traditional synonym of development has been the “exogenous” operating style promoted by the global agencies that define, design and sponsor it, linking it closely with economic growth: poverty and basic needs; natural, human and cognitive resources available; increase in production, income and consumption; and minimum material well-being (regarding nutrition, health, education, clothing and housing).

When talking about sustainable development involves taking a position on the matter, so after reviewing the work of author⁸, it is determined that the most appropriate for the objective pursued here is the so-called Community Model of Sustainable Development (MCDS), since, the principles that constitute are eclectic.

The MCDS is based on the recovery and strengthening of traditional cultures and self-subsistence economies, first to satisfy the basic needs of the communities themselves, and then to produce a surplus for the market. The MCDS is not a global model; that is, it does not cover all sectors of society, rather, it is a model designed for rural communities. While there is not a single point of reference that exposes all these principles in a comprehensive manner, there are readings that present the model in a coherent manner, which include.

In this sense, the same author points out that from the ecological-economic point of view, the temporal space scale on which the community moves constitute perhaps the most suitable dimension for planning, since the biological, ecological and geographical phenomena on the one hand and the primary productive processes, on the other hand, take place on these graduations. For this he

points out that the notion of sustainable community rests on the following postulates.

- a) The ecologically adequate usufruct of local natural resources, that is, a usufruct based on the correct discrimination of environmental units, the recognition of their productive vocations and their capacity for support, and the efficient use of energy. Only in this way can sustained (or permanent) production be guaranteed, based on the natural renewal of ecological and geographical systems.
- b) The multiple or multidimensional appropriation of the totality of the natural resources that make up the means of production of the community, which results from the heterogeneity of the spaces to be appropriated. It means promoting multiplicity and productive integration and, therefore, discarding any form of specialization as a strategy for appropriating resources.
- c) The equitable usufruct of local natural resources based on the equal distribution of all the Eco-geographic units. It should aim to eliminate any open or veiled form of hoarding or concentration of resources.
- d) Self-sufficiency and energetic, material, and technological food sovereignty of the community as a priority objective of any development action, and as a basis for a regional development policy.
- e) The generation of surplus in the form of products required by the whole of the national society and beyond the mechanisms that are usually imposed by the market economy.

2. Materials and Methods

The methodology of this work is approached with the non-experimental, descriptive method that uses qualitative research techniques, which allowed presenting the proposal of a community development model that considers ethno agronomy as one of the axes to achieve sustainability. It starts from the consideration of elements to build a conceptual framework that allows the structuring of a perspective to analyze the problem of community development from new angles, based on the author's professional experience and his participation in research, teaching and networking activities. The Direction of Regional Centers of the Autonomous University Chapingo. The organization of the existing proposals was

made from a thematic documentary review about the central contents of the present study, incorporating a systematization of the experience in the work developed in the south of Sonora.

3. Results and Discussion

The community model of sustainable development proposed considers that any social phenomenon or fact has at least six dimensions (Figure 1) from which it can be analyzed; likewise, from which it can be analyzed; likewise, the sustainability proposal will be valid only for a geographical, social and political context, on a specific spatial and temporal scale.

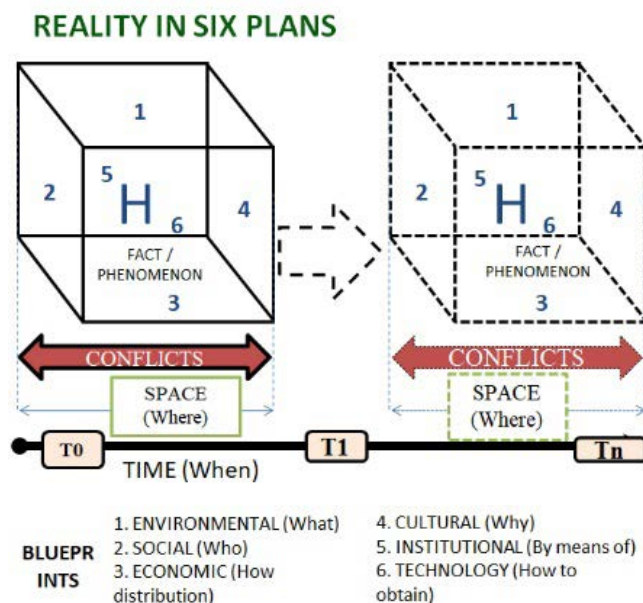


Figure 1. Reality in six planes.

In the particular case of this work, the fact or phenomenon to be considered is the ethno agronomy, according to the definition and characteristics analyzed in the bibliographic review section. Below is a description of each of the analysis dimensions for the model proposal:

i. Environmental: Given that, nature and ecosystems are the material basis of human existence from this perspective seeks to specify the natural resources (soil, water, flora, fauna, minerals, energy) that are the subject of study. It is the analysis of the result of the interaction between human societies and nature. The questions that have to be answered are: What is there?

How many there are? Where is? How is it going? And why is it like this?

- ii. Social: It is the analysis of the relationships established by human beings in society. The aim is to specify the social group (s) and its structure, roles, interactions, norms and values, as well as their objectives and interests. The organization is one of the key axes of this approach. The questions that guide this dimension are: Who and how many? How they live? What do they want? And why are they like this or do they maintain certain conditions?
- iii. Economic: It is the analysis of the relations of production and exchange of goods and services, work and value are the axes of analysis. Answers are sought to the questions what and how much they produce and sell? What, how much and what do they buy? How do they produce and sell? And why are they like this or do they maintain certain conditions?
- iv. Cultural: It is the analysis of all those expressions or manifestations such as beliefs, materialities, imaginaries, discourses and symbolisms that give meaning and relevance to each of the individual acts and collective of a group. Some questions are: Why do you believe in such a thing and not in another? What does it mean? Since when is a certain thing mentioned or considered? In what sense and in what context can such or such be justified? Expression?
- v. Policy: The policy is the set of objectives, decisions and actions taken strategically by the group in power to achieve objectives and solve problems that, at a given time are considered priorities. Of the questions that are answered, they highlight: What was the process followed to detect the problems and determine the alternatives to be implemented? How to achieve alliances between public and private actors to achieve policies of greater impact? What is the responsibility of the different actors in the proposed results? What are the possible, interests, negotiations and conflicts that will arise from the implementation of the proposed policy? What is the official policy established in this regard? What is the legal framework that regulates it?
- vi. Technological: Technology is a key lever for the performance of productive processes. It is the interface between humanity and nature. Technology is a human creation to obtain means at a lower cost and to achieve ends. However, its use has given rise to major conflicts of a social, ethical, ecological and, in general, human

nature. The basic questions to address this dimension are: What is the technological level you have? What kind of technology is applied? What are the environmental, social and economic impacts that its application produces? What were the latest technological innovations introduced?

- vii. Levels or scales of analysis: It is directly related to the determined place (geographic space) in which the proposal is developed. At larger scales the analysis will be more aggregated and abstract, while at smaller scales it will be more detailed and concrete. The level or scale of analysis (Figure 2) will also have to be considered in the approach to the problems to be analyzed and the hypotheses to be formulated.

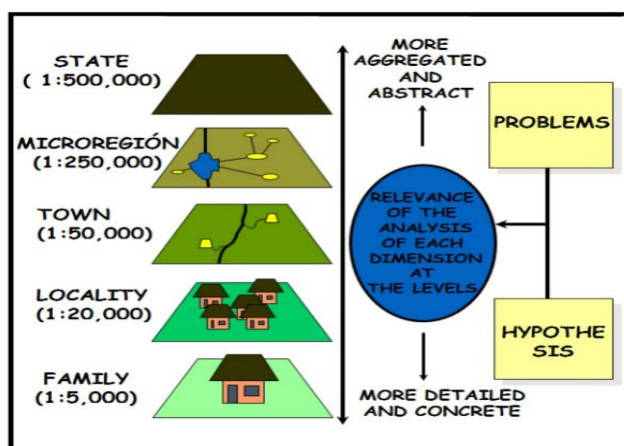


Figure 2. Levels or scales of analysis.

- viii. Time scale: Time must be represented in the scale that corresponds (ages, periods, centuries, decades, years, seasons, months, weeks, days, fraction of day). The activity of man in the transformation of nature has a direct impact in a short period and in a close-space, which corresponds to the internality of the action.

Given that space-time is the geometric entity in which all physical events take place, the impact, distant in time and space, which is often not perceived as an effect of the phenomenon, corresponds to externalities.

When will the impacts be felt? When will the evaluation be made? The model is organized in the following phases:

Phase 1. Diagnosis: This stage begins with contact with the population, authorities and organizations of the communities in which they will be working, in order to sensitize them. During this first stage, an outline of the

main problems and the prioritization of them by the population is obtained. In addition, solution options and defined lines of action will be generated considering the resources available in each community, which will lead to specific projects. In the hierarchy of the problems should consider factors such as: 1. The extent or amount of people affected by the problem: This criterion is an identification of the magnitude of the population harmed by a particular problem. This criterion should make it possible to determine the impact of the problems fundamentally on those sectors of the community that are most vulnerable and socially excluded, so that the prioritization of the shortcomings corresponds to a solidarity practice of immediate support to the neediest. 2. Capacity for resolution by the community: Starting from the basis that most of the problems must be agreed upon and resolved by the community itself. 3. Gravity and intensity of the problem: This refers to the problems can be differentiated as urgent, priority or daily. Depending on its category, the solution to it will be sought at the most opportune moment of application of the model.

Phase 2. Prioritization of needs: To objectively determine the lines of action, it is necessary to obtain certain capacities in the community, which guarantee not only the planning and execution of projects, but also generate the ability for them to continue managing their future own improvement actions. During this phase the lines of action will be defined in which work will be done jointly with the community, at this level the generation of projects that will be sought: 1. Strengthen the social fabric to consolidate the social capital of families and their communities., strengthen the bonds of solidarity and encourage the participation of their communities in their design, execution and evaluation of public policies. 2. To promote equality of opportunities between men and women by enhancing their basic capacities in a free, full and equitable manner. 3. Generate a culture of co-responsibility of society in all actions linked to prevention and health care. 4. Generate processes of productive articulation in the entity, that allow to boost the generation of jobs and investment, taking advantage of the economic vocations of the region and strategic alliances. 5. Incorporate sustainability criteria that seek the preservation of the natural heritage of families and their communities. 6. Promote orderly, productive and co-responsible development, as well as the recovery of state lands with criteria of sustainability, to make efficient use of their potential

and productive vocations, and 7. Promote a respectful and inclusive dialogue, with full respect for plurality and the difference of ideas, based on legality, tolerance and the construction of consensus.

Phase 3. Training of managers: The development of capacities, according to UNDP 2009, refers to the transformations that empower people, leaders, organizations and societies. If something does not lead to a change that is generated, guided and sustained by the beneficiaries to whom it is destined, it cannot be said that it has improved the capacities, even when it has served a valid development purpose.

Therefore, the training of managers who share this vision will be fundamental to propose the projects to be implemented in the community.

Phase 4. Evaluation and follow-up: this phase presents the results obtained through the qualitative and quantitative evaluation of the application of the first phases of the model and subsequently the projects that were implemented to continue monitoring them. In this phase, the changes resulting from the operation of the model must be evidenced and quantified, and the strengths of the model as well as the weaknesses thereof can be analyzed; this will serve to implement improvements in the process and operation. Given that the model is intended to be within the framework of sustainability, the following are some questions that should be considered.

In, define sustainability as the maintenance of a series of objectives or desired properties over time, is therefore an essentially dynamic concept that necessarily starts from a value system. They find, therefore, that although there has been an attempt to arrive at a universal definition of sustainability, this seems impossible. So they conclude that sustainability appears as a multidimensional characteristic of a socio-environmental system, thus becoming a concept that must be analyzed according to the social context in which the analysis and implementation of alternatives is carried out. In this sense, in any proposal for sustainable development it is necessary to give answers to these questions, so we must consider the following: a) what will be sustained, refers to the object of study in question. It is the definition of the system and its characterization; b) For whom sustainability refers to the direct beneficiary, depending on the social actor, the concept of sustainability may change; c) Who will carry it out, wanting to develop a sustainable process implies whoever proposes it; d) How it will be carried out, what is the strategy to follow in order to start the process of

sustainability of a system; e) In what spatial scale, it is necessary as well as the limits of the system are fixed, to fix the geographical limits in which the evaluation will be carried out; f) For how long, to be able to define the time it is essential to take into account the system, it will not be possible to define times if it is not considered the same; g) How the sustainability of the system will be evaluated. The phases and components of the proposed model are shown in Figure 3.



Figure 3. Contributions of the ethnoagronomy to community development.

The start-up is expected:

- Put into practice complementary theories such as ethnoagronomy, social metabolism and sustainable development.
- Improve the quality of life of the community through participation, the conciliation of interests of local actors; as well as technical studies that support decision making for the implementation of trigger projects.
- Establish a baseline that will be the point of comparison so that future evaluations can determine how much the objectives have been achieved.
- Identify the factors of sustainable community development of particular interest and at different scales.
- Apply the local model of sustainable development where the initiatives that strengthen culture, economic development, food security, health, education and management and conservation of natural resources are identified.
- Contribute to sustainable development through the identification of local initiatives, susceptible to becoming trigger projects (production,

ecotechnologies, food security and / or soil and water conservation works).

- Involve public institutions that provide assistance to the rural population, as well as higher education institutions (HEIs), to define their actions based on their area of competence.
- Monitor and evaluate the process of sustainable community development.

4. Conclusions

From the beginning, agriculture has contributed to face the challenges of community development, since the life of the communities has been inextricably linked to it. In assessing that agriculture is an activity capable of satisfying multiple social demands, in areas as diverse as the production of food and raw materials, the conservation of biodiversity, the modeling and conservation of landscapes, preservation of cultural heritage or the economic sustenance of a community, region or country, the ethno-agronomy must be the axis that links the technological, economic-social and cultural issue of the peasants with the development proposals. Therefore, any community development proposal must guarantee the sustainable use of natural resources, the satisfaction of basic needs and the food security and sovereignty of its population, must consider the participation of communities to recognize, validate and use knowledge local knowledge related to natural resources, the genetic diversity of cultivated and wild species exploited, management technology, existence of traditional tools, presence of propitiatory rituals, agricultural calendars, forms of knowledge transmission, among others, the multifunctionality of agriculture contributes to achieving sustainability, ethnoagronomy contributes to conserving, validating and transmitting local knowledge that gives cultural, environmental and social relevance to the community development proposal, for which reason it is considered a paradigm of research,

teaching and extension the contributions of the ethnoagronomy to sustainable community development.

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