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Doc-Esp-1**

***FUNDAEC:
ITS PRINCIPLES AND ITS ACTIVITIES***

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SUS FUNDAMENTOS Y LÍNEAS
DE ACCIÓN***

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FORWARD

This is the first in a series of publications of CELATER dedicated to rural education. The purpose of these series is to promote serious discussion on a topic that, in spite of apparent widespread interest, receives little real attention from the Latin American governments and even from organizations concerned with social and economic development. In most of the countries of the continent, rural education is a poor reflection of education in the cities and its most noticeable result is the alienation of rural people from their own environment. Many of the attempts to practice a "rural education" culminate in the development of a few isolated skills in vocational programs, or in numerous meetings of discussion promoted by projects of non-formal education, which while useful, do not lead to viable solutions to major educational problems. It becomes necessary, then, to find and analyze those innovative efforts that in one way or another try to face the challenge of rural education in its entirety in the context of the very complex social reality of rural life in Latin America.

But innovation cannot be merely pedagogical; the search for rural educational systems that would lead to significant change in the life of rural people also implies related activities in other fields, especially efforts to integrate the discourse on education with the discourse on science and technology in society in the context of global plans of social and economic development. In this sense, the experience of the Fundación para la Aplicación y Enseñanza de las Ciencias, FUNDAEC, deserves special attention, for it has tried to address and integrate traditionally separate endeavors in education, in science, in technology, in organization, and in rural development in a series of interrelated learning processes it has set in motion in a few regions. This is why its principles and activities have been chosen as topics of discussion for this first publication on rural education.

I. BACKGROUND: THE EVOLUTION OF THE INSTITUTION AND ITS IDEAS

FUNDAEC (Fundación para la Aplicación y Enseñanza de las Ciencias) was created in 1974 by a group of scientists and professionals who were trying to find a more appropriate role for science, technology, and education in the development of rural areas. During the first decade of its existence, it concentrated its efforts in a region near the city of Cali in Colombia, known as the norte del Cauca, but since then, it has been incorporating into its programs an expanding component of research and action concerned with other ecologies and other cultural conditions.

During the late 60s and early 70s, it was becoming increasingly evident that development, defined mostly in terms of industrialization, was failing many of its basic objectives and was not improving the living conditions of the vast majority of the inhabitants of the developing countries. Traditional indicators, such as the gross national product, measured growth but said little about the well-being of the poor; in spite of economic advances in many counties, the conditions of the majority as far as health, nutrition, housing, and especially real income were concerned, had not improved appreciably and, in many cases, seemed to have worsened. It was repeatedly stated that development had created separate sectors in the developing countries: a small modern sector, living the lifestyle of the industrialized nations with the same values, cultural patterns and aspirations, and various popular sectors, mostly rural or in the process of migration to the urban slums, dedicating all of their efforts to subsistence: food, clothing, and shelter.

In Colombia, as in many other countries, search for new social visions contemplated projects that would work more directly with the community and the results of which would be measured by indicators of the well-being of the inhabitants of villages and neighborhoods. Concern with the well-being of specific communities, and an understanding of the problems they faced, had a positive effect on the composition of research and action groups, which were gradually becoming interdisciplinary and were turning their attention to multisectorial action. Within a multisectorial approach to development, education was gaining in importance, especially as a support for other activities. Nonformal education was spreading widely, although its merits were often exaggerated, and it was being applied to an unreasonably wide spectrum of social problems.

The small group of professors who later established FUNDAEC participated initially in an interdisciplinary group at the Universidad del Valle and familiarized themselves with the work of a number of similar groups. But soon, they were convinced that as valid as the efforts of these groups are within an overall plan of development, they only constitute a better organization of the modern sector in order to study and understand the poor and, hopefully, offer them a few improved services. Multisectorial actions from the top, even when successful in coordinating agencies and in bringing together diverse disciplines, at best provide partial solutions for the problems of development. It seemed clear to the group that the majority of programs and projects known to them, treated development as a

package to be delivered to the "underdeveloped" by the "developed countries" and their collaborators in the modern sectors of the Third World. The prevalent discourse at the time on integrated rural development undoubtedly was a step forward, but could also be interpreted as an effort to make the package more complete. On the other hand, arguments against the principal currents of development, in general, were limited to highly theoretical political statements, and offered little to those who were becoming involved in the lives of specific rural populations and were trying to forge jointly with them new paths of more equitable social and economic development.

The recent awareness of the importance of participation was, in the eyes of the founders of FUNDAEC, a matter of great significance for the future of rural populations, but unfortunately, more than often, participation was reduced to simple or elaborate methods to induce the villagers to become involved in plans already designed by others. To use a now worn out phrase, most projects, even those calling themselves participatory, were concerned with development for and not by the people.

Concern with community participation is not new, and many development projects have incorporated its principles to some extent into their activities. Feedback, contribution in labor and kind, involvement in the detection of needs and formulation of plans, are examples of prevalent views on community participation. The originators of FUNDAEC, however, tended to examine participation more within the context of the institutional capacities of a people and the organization of their common learning than in terms of the methods of dealing with segments of the population.

The group recognized that the differences in conditions of the modern and popular sectors in Colombia go beyond simple disparity in economic capacity. The modern sector includes a large number of institutions that allow it access to political power, to information, capital, and credit, as well as the proper use of technology and technical assistance. In the rural areas, little administrative structure exists. The channels for the flow of resources and information seem to end at the interface between the modern and the popular sectors. Even the more successful development projects have had to manage their resources through the institutions of the modern sector and tailor their actions according to the structure of these institutions, which have experience in working only with successful owners of large tracks of land. The full scope of the structural differences between the lifestyles of the two sectors is only slowly and painfully being recognized by these institutions. Thus, with a few exceptions, extension is planned according to the schemes successful with the large farmers, whose needs for assistance are specific, who can progress independently of their neighbors, who are usually better educated and have access to many sources of information, and whose net production at a given harvest is not necessarily crucial to other aspects of their lives such as the education of their children or the health care of their families. Large holders have access to more than one source of credit, can sell their products to more than a single buyer, and often have investments in the marketing system. In all, they participate directly or indirectly in a number of institutions from which they can choose a variety of services.

Far different are the conditions of the inhabitants of the Third World villages. They need both basic education and specific technical assistance. Their only capital is their small holding, which does not attract credit from different sources. Their hopes for credit depend on the whims of official agents who visit them occasionally. There is little or no infrastructure on their farms and technological advances they may be aware of are not accessible to them. Their inability to choose sources of technical assistance, credit, and markets means that they must buy and sell at

prices beyond their control. Above all, their destiny is inextricably tied to that of their neighbors; their village has to progress, to be educated, to have access to information, credit and technical assistance, and to develop its own viable organization.

The basic concepts that finally emerged from these deliberations of the founders of FUNDAEC are all rooted in the conviction that significant participation necessarily implies the existence of institutions and structures that in a real sense belong to the population that is to choose and walk its own path of development. Moreover, the creation of new institutions, or the strengthening of existing ones, by themselves do not bring about participation. A second essential element, undoubtedly as important as organization, is knowledge. It could be claimed that a people were in charge of their own development only if they were learning systematically about the changes that occurred in their society, and were consciously incorporating in their continuous learning process appropriate elements from the universe of knowledge: their own, the modern knowledge system, as well as the experiences of other people and groups in the world who are facing similar challenges. The original group of FUNDAEC became convinced that only when both of these elements, appropriate structures and a systematic learning process with access to global knowledge, were in place, could rural populations throughout the world interact in equal terms with others and cease to be the objects of the plans (beneficent or harmful) of other individuals and institutions.

From among a large number of social, economic, and cultural structures that the people of the region of *norte del Cauca* (an extension of 90,000 hectares with 100,000 inhabitants) would have to develop, FUNDAEC dedicated its efforts to the establishment of an institution that would gradually evolve and become the learning institution of the region. For various reasons, the newly created institution was called a Rural University, questioning thereby the usual university models that are being used everywhere as instruments of a defective process of modernization.

The tasks of the Rural University were defined in terms of setting in motion a series of learning processes among the population of the region, hoping that the knowledge they generated would create and increase the forces that are necessary to resist the opposing forces of social disintegration and gradually lead to positive change. However, before describing these learning processes, it seems convenient to refer to some of the basic concepts that have guided the activities of the Rural University during its decade and a half of existence and evolution.

It is customary to think of the creation of an institution in terms of exact definitions of objectives and goals, of the organigrams, procedures, and operative systems. For the founders of FUNDAEC, all these organizational arrangements would have to evolve in action and did not need to be formulated according to the day's fashionable theories of organizational development. Simply, as a first step in setting up an institution. they embarked on a long process of consultation and deliberation that would allow them to reach a minimum degree of unity of thought on basic principles; they tried to outline the beginnings of a conceptual framework that would then evolve as they entered their search for alternative paths of development with the people of the region they had chosen to serve. The following are some of the results of these deliberations:

1. The populations with which FUNDAEC would interact would not be perceived according to the visions common in the development literature and among projects of social action. Defining the poor as masses of undernourished people, overwhelmed by problems and needs-housing, employment, sanitation, education,-places them in the minds of everyone, either as

- obstacles to development, or as elements of a political force that can be manipulated in the name of justice, well-being, or progress. It would be much more accurate and constructive for FUNDAEC to consider the participants of its programs as irreplaceable resources in a self-sustaining process of change. The challenge would be to find paths of action that would help the population translate this potential into reality and create possibilities for viable plans of development.
2. Linked to this vision of the people as resources for social change is the strong conviction that every human being possesses great potentialities that an appropriate educational process can help develop and channel towards service to the community and to society at large. It was this conviction that led the group to begin its projects with the design of an educational program for the integral intellectual, spiritual, and social development of rural youth, who in turn constituted resources for the subsequent programs of research and action.
 3. Another point of agreement had to do with a widespread crisis in the very conception of the nature of man and society. Dominant ideologies, while praising the human being abundantly, tend to reduce him finally to an object of manipulation by either an unjust market or a deified state, to an insatiable pleasure seeking consumer of goods, or an untiring participant in power struggles. FUNDAEC would always analyze problems of poverty and social disintegration bearing in mind this acute crisis of identity, and develop its programs as contributions to a far more exalted vision of the human being.
 4. Without entering into ideological and religious details, the group reached a common understanding of what was identified as the two interacting aspects of human nature. The first, shared with the animal kingdom, is the product of the process of material evolution with survival as its basic objective. Although useful and necessary, if left to its own, this nature tends to show forth the characteristics of a lower existence, cruelty, ego, and violence. These characteristics, which in the animal world cannot be labeled good or bad, can be overcome, however, if man's true and spiritual nature, with infinite potentialities for qualities such as love, justice, and generosity, is allowed to develop and rule the first. In spite of all the manifestations of cruelty and injustice in the world, through a proper educational process, the spiritual nature of every human being can flower and a prosperous and advanced civilization can come into existence.
 5. Development defined in terms of certain patterns of modernization" seems to refer exactly to those processes which promote the domination of man's material ambitions over his spiritual goals. One of the manifestations of this type of progress, and this unbalanced obsession with industrialization is the accelerated disintegration of rural life witnessed during the past few decades. The analysis of the existing rural problems and the historical evolution of development efforts in the post war era convinced the founders of FUNDAEC that this false version of modernization is not only a goal unattainable by the majority of humanity but also undesirable, and that the misery that reigns in rural areas and the slums of many cities is nothing but a logical consequence of the bankruptcy of dominant social ideologies. This conclusion, however, should not be identified with romantic conceptions of traditional societies and a unwarranted defense of subsistence and peasant economies. The development programs of FUNDAEC, as modest as they would necessarily have to be, would have to evolve in the context of a search for a scientifically and technologically modern society, which, however, would base its educational, economic, administrative, political, and cultural structures on the concept of the integral nature of man rather than his mere material needs. It was agreed that under such conditions, the relations between urban and rural life would also develop in a far more

balanced way than the patterns that have evolved within the present world system.

6. Within this context of a process of search for alternative development, a great deal of importance would have to be assigned by FUNDAEC to the role of science, as the capacity of a people to participate in the generation and application of knowledge is an essential component of the development process. It was argued that in the absence of the appropriate structures for such a participation, knowledge is easily managed for the benefit of the privileged in the global society, responding only to the interests of the dominant social ideologies which are basically neglectful of the needs and aspirations of "campesino" populations. The villagers of the world receive a technology that is the result of scientific progress applied to the conditions of larger farmers whose logic of production is entirely different from that of "campesino" societies in the process of transition and/or disintegration. The rural university then would be a social space in which two systems of knowledge, a modern one (in all its sophistication) and a traditional one pertaining to the people of the region would interact in a healthy way to produce important development processes from within the rural population itself. Research and education, the two main components of the activities of the rural university, would be carried out precisely in the context of this delicately balanced interaction of distinct knowledge systems .
7. Having decided that development should not be the process of imitation of the so called developed countries," it was logical to reach the conclusion that one was embarking on a search down an untrodden path. In this sense, then, the task of FUNDAEC would be more that of a scientific search than of the implementation of a blueprint with predetermined goals and objectives. Naturally, as answers to specific problems were found, certain well organized plans of action would have to be implemented, but the element of search and learning would always have to be present to some degree even in a straightforward plan of action, if the Rural University was to participate in its implementation.
8. The group also concluded that rural areas need much more than the usual interventions in education, health, production, infrastructure, and organization. Throughout the world, old structures and organizations of rural people have been destroyed by the forces of modernization, but no new structures have taken their place. The Rural University would have to pursue its goals with the understanding that all the processes of rural life, production, simple construction and repair, marketing, the development of human resources, socialization, the flow of information, adaptation and the improvement of technologies, health care and sanitation, and decision making are in need of structures that may connect them to the corresponding structures of the political, social, economic, and cultural life of a new world order that is also destined to be constructed in this crucial stage of the history of the human race.

II. METHODOLOGY AND AREAS OF ACTIVITY OF THE INSTITUTION

A. The Methodological Perspective

As mentioned before, the Rural University gradually evolved as its founders tried to apply the principles of participation and self-reliance to the social and economic development of a rural people, principles that for them implied the existence of appropriate structures and institutions that would elevate participation from an almost manipulative method of dealing with villagers, to a meaningful social process. This task of the Rural University to create and strengthen new rural structures, in the broader context of learning, calls for a methodological perspective that would enable it to translate general ideas into concrete programs and projects. Such a methodological perspective has gradually emerged in FUNDAEC from attempts to describe and to analyze, for each rural region, the processes of individual, family, and community life that necessarily occur within all rural populations. The description, even in its most rudimentary form serves as an excellent basis for more substantial deliberations on how to influence the evolution of a rural society and how to promote the organic change that must be brought about in its structures.

These processes of rural life can be described, as a first approximation, by analyzing some of the chains of activities that different individuals and groups within the population carry out on a daily basis. Such an analysis easily leads to a list of on-going sets of related activities which, in turn, suggest a series of learning processes as the first components of an autochthonous process of change. The plans of the Rural University, at least in their most general formulation, can be then organized in terms of these chains of activities and the corresponding learning processes:

- The chains of activities related to the production of crops and animals in the farm have led to the establishment by the Rural University of the process of search for alternative systems of production in small farms for specific regions.
- The productive activities (individual or in groups) of those who do not possess even a small farm, but assign small areas around the house to raising a reduced number of animals-a few pigs and chickens-have required a learning process concerned with the establishment of small units of production and promotion of group action.
- The chain of activities that tend to support agricultural and animal production, such as irrigation and land preparation services, the production and distribution of seeds, and food processing, have led to another learning process that in FUNDAEC is referred to as the establishment and strengthening of support and service micro-enterprises.
- The set of diverse actions that allow people to maintain and improve individual and community health is the origin of another learning process on community health and environmental sanitation.
- The analysis of the markets and the flow of goods and money in the region is the basis for the formulation of a set of interrelated actions and research activities in a learning process about marketing and the establishment, flow, and management of funds in the community and in the region.
- The set of activities having to do with formal education in the region mostly around the primary school, but gradually expanding to include higher levels,

has led to the corresponding process of research and action concerned with the development of a formal educational system.

- Observing how small children receive their cultural heritage and begin to participate in different chains of activities is the starting point of a learning process related to socialization.
- The very important set of activities related to horizontal and vertical communication inside the village and in the region has led to the establishment of yet another learning process known as the flow of information.

The above description does not exhaust the long list of processes of life that may be identified in a region, nor do the groups of activities that have been used as the background of each learning process constitute unique arrangements of natural sequences. In fact it must be clearly stated that the choice of this set of learning processes is not simply the result of an objective analysis of the life of the population, but also a consequence of the forces that shape the social space available to an institution like FUNDAEC, as well as the talents and the resources it can bring together at any given moment.

It is also important to note that, independent of the exact grouping of activities, the methodology in question is concerned with highly dynamic situations—the processes of life and the corresponding chains of activities undergo continuous change manifested in the quantity and the quality of the resources they use, the social relations they imply, the knowledge they utilize, and the very manner in which activities are carried out on a daily basis. Change, however, is often not for the better, for powerful forces from the society at large persistently introduce new limitations into the life of most rural populations, and unfortunately, forces from within also do their share to accelerate disintegration. The basic hope of a methodological perspective based on the establishment of learning processes within a population is that the knowledge generated by these would somehow lead to internal forces that could curb negative tendencies, and ultimately, set a new course for the evolution of the processes of life towards the goal of a new and just social order.

The emphasis on internal forces, however, should not be interpreted as a naive hope that rural development could be the result of isolated changes inside the rural people themselves and that fundamental change in the powerful forces from outside are not also indispensable. There is no doubt in the minds of the participants in FUNDAEC's programs that substantial improvement in the conditions of the rural inhabitants of the world finally depends on organic change in global as well as village structures. However, in a long-term process of development, numerous types of action have to be undertaken parallel to each other, and institutions must decide how they can best contribute to change according to their possibilities and inclinations. The creation of a Rural University as described in this document sets in motion in rural regions important processes that, in spite of their limitations, are indispensable prerequisites of meaningful participatory programs of autochthonous socio-economic and organizational progress.

B. Learning Processes and the Corresponding Lines of Action

In order to offer the reader a few concrete examples that may clarify the above statements, this section is dedicated to a brief description of some of the activities of the Rural University and their evolution. Depending on the nature of the problems to be attacked and the opportunities available to FUNDAEC, each learning

process has evolved in its own particular way. Some learning processes have been set in motion beginning with a modest research project. Others have developed out of involvement in one or two simply designed actions at the community level, or from a set of courses offered to a limited group of students. One learning process is the result of offering some assistance to projects already under way in a few villages. Every one of these activities, however, has gradually grown and become organized in a sequence of projects consisting always of three components, research, action, and the organization and socialization of knowledge generated in the process. But from all the actions of the Rural University, those directly concerned with the development of human resources are the most essential, as the basic aim of every learning process is the building of the capacity of the rural people to forge their own path of development. Thus no matter how a learning process begins, the tendency is invariably to organize, sooner or later, the results of initial learning in short or extensive courses of study, for farmers, for families, for groups, for promoters, and in general for workers at different levels of competence. Words such as courses and educational programs, however, are not meant to convey the image of the different mixtures of training courses that official and private agencies constantly offer rural populations. The very nature of the research activities and the interventions of FUNDAEC and the way their results regularly modify the content and the methods of the corresponding courses, as well as the organization of the courses themselves and the emphasis on participation in ongoing research and action along with traditional classroom activities, endows the educational programs of the Rural University with an enabling environment not common in the usual courses of instruction. On the other hand, by formalizing the majority of the activities of learning processes as sequences of courses with different segments of the community, the Rural University achieves a cohesive internal organization more in tune with its main objective-the promotion of learning and the development of human resources. Its frequent intense involvement in direct development action in a few villages should not be interpreted as a departure from this purpose; it is simply a consequence of the principle that learning can be best achieved when everyone participates in activities that are of immediate use to the population and make meaningful contributions to the basic goal of bringing about the development of the villages.

1. The development of a formal educational system.

Some of the basic concepts that have guided the evolution of this learning process are discussed in section IIIC of this document. It suffices to mention here that at the time of the creation of FUNDAEC, capacity building in the context of participatory rural development was mostly examined in the framework of non-formal education in an atmosphere that was highly critical of formal educational systems. FUNDAEC, however, argued throughout the years that as valuable as non-formal methodologies are, a more global vision of development cannot ignore the value of formal education; after all, not only the villagers but also many of those who promote the cause of non-formal education are constantly striving for the establishment of better schools for their children. The challenge, then, is not to reject formal education per se but change its content and make it relevant to the needs and to the development plans and opportunities of the people.

Moreover, formal education for rural areas is often treated as synonymous to primary education which is considered by all as a most urgent need of most developing regions. But, in Colombia at least, the official plans for the universalization of primary school have advanced reasonably well and the form and the content of the years to follow are issues that become increasingly important as more and more villages express their desire to have access to secondary education. However, beyond the problems of the continuation of primary school, the question that has been discussed vigorously at FUNDAEC during the years has been: How

much has the expansion of primary education actually changed rural areas for the better?" The issue, of course, is not one of the undesirability of primary schools in spite of all their present shortcomings, but a profound concern for the plight of rural youth who, knowing how to read and work out simple arithmetical operations, still have little possibility of advancing in life and are hardly prepared for effective participation in the community's search for viable paths of development. Would it not be more reasonable to redefine basic education in terms of a first set of capacities that would enable a young man or woman to contribute effectively both to the work of the family and to the processes of change that are to be set in motion in the village, and treat the present content of primary education simply as an important but not complete requirement of a program for the development of a set of enabling intellectual and spiritual capacities and attitudes in rural youth who can become the most valuable human resources for social change?

Almost a decade of carefully monitored and evaluated educational action (not traditional educational research) with rural youth has finally provided FUNDAEC with a definition of basic education that satisfies its criteria of participation in community affairs as well as its expectations of the intellectual performance of its graduates. The corresponding program seeks to form a Promoter of Rural Well-being within a specially designed system known as the 'sistema de aprendizaje tutorial', SAT. The system helps rural youth to study a set of 28 textbooks, developed by FUNDAEC during the past fifteen years, in regular weekly meetings of about 10 hours a week and complete the entire program in eighteen months to two years. Each group of SAT receives instructions from a tutor who lives in the village or in a nearby center and is especially trained by the Rural University. The textbooks, while covering the areas of knowledge traditionally taught in formal educational systems, follow the students through a series of activities in the community related to health, agricultural and animal production, education and organization. There is no doubt by now that SAT develops in its students capacities that surpass the intellectual level assigned to rural youth by a prejudiced society, and especially endows them with social vision and useful skills for effective work in the family farm and for valuable service to the community.

It is customary to cite formal educational systems among those components of society that are most resistant to change. However, the ministry of education in Colombia has proved to be a great supporter of the educational activities of FUNDAEC. Through a series of resolutions, it has already given official status to the experiences of the Rural University and has approved SAT at the level of the Promoter of Rural Well-being as equivalent to two years of secondary education. It is now supporting a systematic joint project to modify and expand the system to other rural areas to which the program proves to be applicable.

Based on the curriculum for the training of the Promoter of Rural Wellbeing, the Rural University has then developed the equivalent sets of textbooks for two other levels, the Practitioner and the "Bachiller" in Rural Well-being. These, the ministry has recognized as equivalent to the fourth and the last year of high school, thus completing an entire secondary component of a formal system for rural regions.

It is important to note that the content of the program for the three levels is by no means easy and rural is not equivalent to second rate in the vocabulary of FUNDAEC. In fact the scientific level of the curriculum is so high that the greatest challenge has been the training of teachers who could teach the entire curriculum, whether within the official system, or in the programs of an increasing number of non-government organizations that are beginning to incorporate SAT into their plans of community development. As a possible answer to this important challenge, the Rural University is now in the process of establishing a university career in rural

education utilizing the results of a previous experience with a small group of rural youth in a program called engineering for rural well-being.

The areas of research and action that are presently occupying the rural university in this learning process can thus be summarized as: the training of tutors for SAT for different institutions; monitoring and evaluation of groups of SAT sponsored by other organizations and the further development of the corresponding methods and instruments; the development of the details of the tutorial system for the two following levels, the Practitioner and the Bachiller" in Rural Well-being; the development of the curriculum and the establishment of the university program in rural education; and the modification of some of the textbooks according to the ecological and cultural requirements of other regions.

2. Search for alternative systems of production in small farms

The views of FUNDAEC on issues related to science and technology are discussed in more detail in section IIIB of this document. Here, a few words are included about the development of a specific learning process which, next to the above mentioned effort to create a formal educational system for rural areas, has absorbed the greatest share of the resources of FUNDAEC for about twelve years. Its most visible success has been the development of appropriate systems of production and technologies for norte del Cauca, but its value also lies in the creation of a working methodology and a conceptual framework that is gradually being disseminated to other regions.

The first two years of this learning process were dedicated to collaborative efforts with some of the farmers of the region in small experiments mostly concerned with the physical arrangement of crops on the farm and the distribution of the time of the farmers among various tasks in a diversified plan of production in small modules. The fruits of this experience were not so much new and more appropriate technologies but the knowledge that was generated as the FUNDAEC professionals immersed themselves in the life of the people of the region. It was strongly felt at the time that the usual attempts to carry out extensive studies and surveys somehow missed the point that the first stages of a meaningful participatory development process must create strong bonds of solidarity and friendship among the professionals from outside and the villagers, and that nothing can achieve this goal more effectively than facing the difficulties of life on a daily basis together as co-workers in search of new and practical solutions to problems that are analyzed jointly and approached with care.

The knowledge generated and socialized during this period is not entirely new, but it helped everyone to understand in a more explicit way the many details of the rationality that has traditionally governed agricultural and animal production on the small farms of the region. Although the purpose of the Rural University is to develop, if necessary, entirely new systems of production, it was clearly understood that some of the elements of this rationality were to be preserved in future developments and even strengthened. The criteria that were subsequently formulated on the basis of these observations to guide the search for alternative systems of production are not very different from what is being discussed today by many groups in the world working with different rural populations. The systems to be developed would have to improve the production of food at the level of each farm and obtain a better nutritional balance for the family. They were to utilize more efficiently the resources of the farmers. In contrast to "modernized" monoculture, diversity of species was to be promoted so that risk could be minimized. Great care was to be taken to conserve and improve the quality of the natural resources of the farm especially through the improvement of the

management of the deteriorating soils of the region. The systems had to be arranged in such a way that the work of the family members could be regulated avoiding periods of excess and deficit, and parallel to this, the flow of food crops and of money throughout the year had to be also regulated. The use of costly inputs was to be decreased although systems totally free from the use of chemical products were not envisioned for the near future. Finally it was hoped that the alternative systems would not contribute further to the individualistic attitudes that were already being propagated in the country at an alarming rate but that they would be consistent with the spirit of a community built not on competition but on the principle of cooperation.

The intensive work carried out with the farmers during this period also showed that, at least in norte del Cauca, the process of the disintegration of traditional economy had advanced too far and that it was impossible to bring abrupt changes to the system of a farm the owners of which had already made the necessary adjustments and lived from the very low production of the farm (managed with minimum input) and supplementary income from the occasional outside work of the family members. Moreover, the kind of changes that were necessary to increase income from the farm appreciably implied a rather high level of investment if from the beginning the entire system was to be changed. The answer seemed to lie in focusing attention on smaller areas of the farm at a given time and gradually increase the area cultivated according to the requirements of new systems. It was in the process of implementing this possibility that a new vision of the search for alternative systems as sums of subsystems rather than aggregates of single elements was formulated. The word subsystem is used here somewhat differently from the usual references to crops, animals, or even the family as subsystems of a farming system; a subsystem in the vocabulary of FUNDAEC refers to a small part of the farm usually between one and five thousand square meters with a definite program for the management of a diversity of plant and animal species arranged in space and time following the criteria that have been set forth for the entire system. Each subsystem involves intensive use of the land including the utilization of fences for production. Work with each subsystem occupies only a portion of the farmer's time, and by itself is economically profitable. Individual farmer families can start changing their production technology by adopting one single subsystem and gradually incorporate more until they have found a suitable system for their own specific conditions and aspirations.

During the decade that followed, researchers of the Rural University and an increasing number of participating farmers of norte del Cauca dedicated a great deal of effort to the development of appropriate subsystems for three zones of the region divided according to soil and climatic conditions. The result is now a set of some 15 well tested subsystems that are far superior both to the traditional systems and the modern monoculture that unfortunately continues to be propagated by many programs. Encouraged by this success, the Rural University has focused its attention in the past three years on two important sets of objectives. First, it has become increasingly involved in two other ecological regions where, in collaboration with other institutions, it is trying to repeat its experience systematically, make the necessary adjustments to its methodology, and learn to share it with others. The second set of activities have to do with the search for formal village and regional structures: small village plots dedicated to experimentation, community learning farms, village technical committees to manage some of the experiments, community funds managed by a committee of the villagers, and possibly a regional fund to handle increasing sums for investment and credit to individuals, groups, and community organizations. Both of these new efforts are now in progress but it is as yet too early to evaluate results and make definite statements about the final form of the corresponding processes and structures. It should be stated, however, that the success of these efforts is

essential if the Rural University is to create a permanent basis for a participatory process of technological transformation.

Examined in the context of courses and educational programs, the activities of this learning process can be described in terms of three programs for the development of human resources. The first is directed towards farmers and proposes to develop their capacity to be excellent producers within new and more appropriate systems of agricultural and animal production as well as effective participants in research and in the application and the socialization of knowledge. The second program is directed towards the field workers of other development organizations, both official and private, in order to increase their capacity to offer technical assistance to the farmers. The third program involves contributing to a series of seminar-courses at the graduate level offered by CELATER for professionals who are already working with rural populations not as disseminators of technological packages, but facilitators of the generation of knowledge for change. Parallel to these educational activities and intertwined with them, the Rural University continues to carry out the necessary research to create new subsystems to increase the diversity of species, to find improved procedures for the management of the natural resources especially the soil within each subsystem, and also to examine on entire farms the necessary adaptations that have to be made in order to establish total systems that are economically viable and at the same time meet the criteria that have guided the activities of this learning process.

3. Small scale production for groups and families with little access to land and the promotion of group action

This is a learning process that began during the first years of the Rural University in the context of the creation and consolidation of groups which has been the subject of a great deal of deliberation in FUNDAEC. A small unit usually of animal production seems to be a necessary element that can contribute to the consolidation of a group at some point of its evolution. It also offers extra income to some of the families of the region who by now have lost most of their land and depend almost entirely on outside work in order to maintain their very modest living conditions. Some of the activities of this learning process have been concerned with technological alternatives for small scale animal production and are very similar to those of the previous process related to farming systems. But the most valuable experience has been gained in working with groups and in the corresponding activities of community education.

The formation of groups in the region of norte del Cauca has not been an easy task for FUNDAEC and many of the underlying concepts of this learning process have gone through a number of profound changes. The basic difficulty has been with the idea of interest groups as elements of a program that is searching for the processes and the structures of a fundamentally different type of human society. Once the appropriate methodologies are discovered, it is not difficult to bring more or less homogeneous groups of people together and teach them to defend their common interests be it by competing in the market, or by becoming more effective in the game of political negotiations. The question is whether such an effort contributes to the creation of a new type of village, or it simply transfers to the rural people the very attitudes and practices that are mostly responsible for the present unjust state of society. The history of development offers too many examples of apparently sound community development programs that in the final analysis have created nothing but local elites who have actually become obstacles to further efforts to eliminate poverty. For FUNDAEC the real challenge of community development is the establishment and the strengthening of autochthonous village structures that serve the interests of all the inhabitants, promote and maintain their unity, administer local justice, attract the means for the education of all village children

and youth, and in general support the various processes of community life ensuring the highest level of orderly and effective participation possible. It is only within this context of working and strong village structure that the work of different groups with common interests becomes a positive component of a development plan adding to the vitality and the effectiveness of the population of a region.

The problem with this formulation of the learning process is that in the absence of the appropriate structures, it is rather difficult to consolidate groups, while one is always on guard that too much solidarity among a few people may lead to the establishment of self imposed leaders who will only serve their own interests. The truth is that after years of experience, the Rural University cannot as yet claim that it has found definite answers to the challenges of this learning process. The activities that are being evaluated carefully most recently seem promising and are concerned with the consolidation of different types of groups, especially women and youth, whose initial motivation and subsequent education directs them first to spiritual and intellectual enrichment in the practical context of deeds of service to the community, and only later to the establishment of productive projects for their own benefit. Even then, an appreciable part of the profits of the group is assigned to projects for the improvement of some aspect of life in the village. As the results of these evaluations are analyzed and understood, they become incorporated into courses for at least two educational programs: family education, and the training of animators of community organization.

4. The establishment and strengthening of support and service micro-enterprises

A rural economy that is entirely dependent on the sale of its agricultural and animal products to an external market and the purchase of every article and service from outside may, at best, achieve momentary prosperity under very special conditions. In order to find mechanisms that would help a rural population break out of the state of total dependence, the Rural University has been involved for the past years in a learning process concerned with small enterprises for the support of production activities, for processing agricultural products, or for those services that can be easily established within the region itself. Although a number of smaller projects have been successful in the past years, the most important endeavor of this process is the establishment in one of the villages of a small agro-industrial center presently consisting of five enterprises. The flow of subproducts from one operation to the other, and the sharing of facilities, are among the factors that make the center an economically viable enterprise, providing the Rural University with a model that promises to be an important structure possibly to be replicated in every group of four to five villages. In the near future, it is hoped that the model and the facilities will also serve as a center for the training of human resources for the promotion of small rural agroindustries, but the experience is as yet not complete and can only be used as the basis of courses and educational programs in two or three years.

5. Marketing and the establishment, flow, and the management of funds in the community and the region

Parallel to the search for appropriate structures mostly to support production, the Rural University has been engaged in a series of activities concerned with the problems of the flow of funds and goods in the region. The problems of the market in rural areas are well known to everyone, and hundreds of development programs have experimented with various ways of solving a problem that is often too deeply rooted in the structures of a country to accept simple local solutions. But although the marketing problem finally has to be solved at a macro level, the organization of

the flow of goods and funds in the community and among villages also needs to be studied carefully as the creation of appropriate local structures can contribute to some improvement in the commercial and financial conditions of the village.

The experiences of the Rural University in this area are fragmented, and the entire learning process has been a source of frustration and has advanced at a very slow pace. However, some very encouraging developments have occurred recently as the result of the establishment of a community store in the village of Alegrias and the subsequent dissemination of the concept to an increasing number of villages. The process of the creation of the community store in Alegrias, the culmination of a number of similar attempts in other villages, finally succeeded in bringing together the necessary elements of unity of understanding, rectitude of conduct, solidarity, and sound economic and administrative practices that made the store an effective and stable element of the more complex commercial and financial structures that have to be gradually developed in most villages. Upon the completion of one year of successful operations mostly dedicated to the purchase and the sale of products, the committee in charge of the store promoted a series of consultations in the village and with FUNDAEC in order to establish a community fund that would be invested in the farms of the village in joint projects with single families or organized groups. Encouraged by the results of these consultations, the Rural University then focused the efforts of its learning process on a search for appropriate procedures, participative structures, and economic arrangements that would complement and expand the work of the community store and endow the village with a mechanism for capital formation and internal management of credit based on percentages of production and not fixed interest rates established according to the vision of those who dominate the economy of the country. Moreover, the extensive results of the process of search for alternative systems of production is offering the villagers an appropriate technological base upon which they can build a successful program of investments.

Once again, the learning process has not advanced enough to be directly linked to formal educational programs and capacity building is accomplished non-formally within the corresponding research projects. It is envisioned, however, that the activities of the next year will lead to a more systematic educational program for the training of administrators of formal village structures.

6. Other learning processes

During the past fourteen years, the Rural University has been involved in a number of other learning processes, but none of them is advanced enough to deserve a separate discussion here. For example, convinced of the importance of the structures that would improve the flow of information in the region, the Rural University carried out an initial study of the traditional channels for the flow of information and experimented with small village information posts. Unfortunately, although the results were encouraging, sufficient financial resources could not be obtained to continue with the next stages of the learning process. Similarly, efforts concerned with socialization have met with the same fate, and presently the only related activity is a Unit on preschool education in the program for the training of animators of community organization.

Finally, a few words should be said about decision making which invariably proves to be an essential component of any learning process. In an ongoing debate in FUNDAEC, the question has often been raised if decision making should not be in itself the main theme of an independent learning process, and if so what are the corresponding processes and structures that would have to be created or strengthened. The difficulty that is always brought out in these deliberations is how

to avoid, in this search for a different social order, the replication of the very attitudes, procedures, ideals, and mechanisms that, even when hidden under the name of democracy, finally lead to the consolidation of the power of some people over others. This observation is then followed in FUNDAEC by the argument that the creation of truly new structures presupposes the creation of a different cultural and spiritual set of standards that do not accept the power of men over men, imposed or democratically negotiated, as a legitimate human aspiration. Learning about decision making in the Rural University, then, is assigned to every learning process, hoping that for now the daily practice of a different style of social interaction in the context of a different educational process will gradually lead to the creation and the consolidation of the desired culture, in itself a prelude to a more profound and organic change in the very structure of human society.

III. CONCEPTS UNDERLYING THE PRACTICE OF THE LEARNING PROCESSES

Although detailed analyses of various learning processes, and their achievements and difficulties, are topics of other documents, it is worthwhile to describe here some of the basic ideas that are continuously being applied, examined, and reformulated in the daily practice of the Rural University. For this purpose, three sets of concepts have been chosen: perception of the rural problem; the role of science and technology, and some principles of a rural educational system.

A. Perception of the Rural Problem

The first region in which FUNDAEC concentrated its efforts for many years is located at the southern end of the large Cauca Valley, 250 km long and 15-40 km wide. The valley extends from Cartago to Caloto and is surrounded by the western and central branches of the Andean mountains. Norte del Cauca consists of six municipalities--Caloto, Corinto, Miranda, Padilla, Puerto Tejada, and Santander de Quilichao--which lie in 100,000 hectares of flat land and early foothills of the mountain range. The area is 1,000-1,100 meters above sea level and receives an average yearly rainfall of 1,000 mm.

Like so many rural areas of the world, norte del Cauca is changing, and like most developing societies, is an ambiguous combination of contrasts: poverty and wealth, order and irregularity, continuity and instability, integration and disintegration, peace and frustration. It is another example of a society surviving in the empty space between the traditional and the so-called modern worlds, its inhabitants caught in the dilemma between what is and what ought to be. While fighting the constant battle for survival and for change without loss of identity, they try to remember how it was and ask themselves what they would like to accomplish. Many prefer to reside in the vague past: "When I was growing up, life was much better. Here, everyone owned a farm and a house. One could raise one's family well. We had all the food we needed, and one's neighbors did not have to sell, for the one who had enough would share. But the rich came and began to buy everything. Soon they started to knock down, knock down, and knock down the farms. Here, we will not have any food left. Everything will be finished, everything." Others, more hopeful, try to choose a way out. Although the way is not clear, they all have in mind the common idea of "becoming somebody." Maybe, the way to win and stop this constant battle is to study, to find a job, or best of all to own a large enough piece of land where one can grow one's own food and be productive. "Becoming somebody" is the way most often chosen by the youth of the region. They spend their time switching between temporary jobs and studying. For most, being able to produce on one's land is a farfetched dream. The inhabitants of norte del Cauca continue with the processes necessary for their survival, while a series of forces from within and from outside constantly influence their lives and, most of the time, limit their choices and opportunities.

One such force has been the rapid growth of the sugar industry. The expansion of sugarcane plantations has gradually left a great number of farmers

without land. Wealthy landowners have persistently bought the land from the small farmers: "And so the sugarcane owners came here.... When someone said, 'I am tired of living in these lands; the farm produces nothing; my neighbor is taking the water away, the agents would call the sugarcane owners, buy the land right away, and begin to cultivate sugarcane.... Others, who had always had their farms, their little houses, and some money saved in the banks, would say 'I won't sell; I have no reason to sell.... But you should remember that in this country we have gone through the violencia' and, as a result, many of us have lost most of our belongings...."

Over the past decades, this shift in land tenure has meant a continuous change in the occupation of the population, the change from farmer to farm worker. The landless farmers have been forced to search for work in the sugarcane industries, selling their labor Cutting cane, sometimes on land originally belonging to their own families. Because of the lack of opportunities and the great force of poverty, the people of norte del Cauca have become a transitory population in a state of constant temporary migration to the city. Those with more stability are the farmers who own /fincas, where they usually plant coffee, cocoa, and plantain. There are also those who have permanent employment in the sugarcane industries or in large haciendas. dedicated to raising cattle. The rest are in a constant search for jobs in the nearby cities, mainly in Cali and Popayan, and may even go as far as the eastern plains of Colombia for months or years.

Agricultural production in norte del Cauca can thus be divided into three general categories. The first, in conjunction with agro-industry, mainly consists of sugarcane, soya, sorghum, rice, corn, and beans. Animal production on a large scale also exists in haciendas. The second type of production is that of the small farmers who grow coffee, cocoa, plantain, fruit trees, and perhaps some corn, cassava and beans. The technology used in these farms is not adequate, and the level of production is low. The third kind of production is of families who try to produce some food for themselves and occasional marketing. Here each family owns 20-25 animals-chickens, turkeys, pigs, or ducks-. These animals usually do not bring profits to the farmers, but, along with a handful of different plants, offer the family some cash and food in times of need.

The villages of norte del Cauca are not self-sufficient units of production, although they continue to be producers of primary materials, mostly for the benefit of the modern sector. The inhabitants of these villages are highly dependent on the existing markets in the nearby cities for the sale of their products and the purchase of necessities. The region is by no means the idealized rural area where civilization, with all its assumed benefits has not yet been able to reach; its inhabitants are integrated into the life of modern Colombia, especially the commerce and the labor market under the influence of the nearby city of Cali. It is simply that the transition into modern life is not proving to be as beneficial for norte del Cauca as everyone has been claiming. Life was probably not as good before as some tend to believe, but it has deteriorated and continues to do so at an alarming rate.

In general, for FUNDAEC, the analysis of the rural problem cannot be reduced to the discussion of simple economic indices of production and employment; more than a region that contributes economically to the national product, norte del Cauca is a part of the Colombian territory where 100,000 human beings live, with their own rights, aspirations, and possibilities to contribute to the construction of a new and different society. To perceive the rural problem in terms of simple indicators of living conditions, low educational level, high mortality and morbidity rates, or even low income is also of limited value, as all of these conditions are mere manifestations of more fundamental social ills. Purely political analyses based on the control of power as understood by prevalent currents of

thought are inadequate as well. As it was mentioned before, the roots of the problem are to be found finally in the crisis of the very concept of the human being and the false vision of what is being promulgated as a highly desirable society.

But, rather than trying to reform the present social order, or promote violence in the name of justice and the irresistible march of history, the real task is to search for new options that render rural life meaningful in the context of a global human society, a society that would be radically different from what has taken shape during the past decades of material progress and spiritual bankruptcy. This search, however, cannot be carried out from the planning offices of development agencies and ministries; it has to be part of the effort of rural populations themselves and those who choose to share in their destiny. The problem is that no society is willing to create the necessary condition of autonomy so that a given rural population may embark on an autochthonous process of development. Autonomy, of course, does not mean total independence, nor does autochthonous development imply isolation. But it is necessary for each people to have the opportunity to examine its past and present, become aware of the strengths and shortcomings of its culture, and through highly participative processes, search for and walk a viable path of organic change.

In an effort to create the rural component of a new society, one can easily identify the many forces that impede the swift completion of most necessary plans and projects. The agrarian policies of the country, the unjust distribution of land, the shortcomings of the market, the inappropriateness of available technology, the expansion of a harmful system of education and communication the content of which causes the disintegration of positive values and relationships, are examples of problems that can be easily cited within the national or the global context. But it is not useful to go to other extremes and romanticize the rural people or glorify their past. One cannot ignore many destructive tendencies among rural populations themselves (reflections of global society or not) such as the disintegration of basic structures of family, of decision making, and of the socialization of knowledge, accompanied by a rapid deterioration of such traditional values as responsibility, rectitude, and solidarity, as well as the persistence of negative characteristics such as oppressive attitudes towards women and certain patterns of leadership.

Within this very complex local, national, and international set of conditions, a small institution such as FUNDAEC has to define its aims in modest terms. What it has set for itself to accomplish is to help one or more rural populations to take the necessary first steps and begin their search for new options, by carefully examining the diverse processes of life in the region, looking for alternative technological and organizational practices, learning from these activities, and in doing so, educating new generations who rather than simple objects of oppression can become effective actors in an unavoidable process of profound social change.

B. The Role of Science and Technology

When the Rural University was first established in 1974, the founders of FUNDAEC were not aware of the extent to which they would soon become involved in technological research. In their initial deliberations they had been concerned with social problems including science and technology issues but mostly in terms of the educational processes that would permit a positive and fruitful interaction between modern science and the traditional knowledge system of the villagers which, in itself, was already undergoing accelerated change. Unconsciously, they were convinced, along with the vast majority of people, that the needed technology for

the rural areas of the world already exists or is being developed in international and national centers. The problem, they felt, was that this technology was not being disseminated and made available in the proper manner. It is true that they were suspicious of plans based exclusively on the propagation of technological packages, but they simply thought that most answers were to be found in the socialization of more profound scientific and technological knowledge and, as yet, did not question the appropriateness of the available technology itself.

As was to be expected, soon after the initiation of their first educational activities, a large number of technical needs were perceived from the mere contact with rural families, and the professors and the students of the program were forced to make concrete technological choices. In agricultural production, where most urgent needs were identified, during the first two years, FUNDAEC worked intensively with a few families of the region using the latest technological packages from the international and national research systems. The results were not encouraging and the group began to see clearly that much of the available technology simply was not appropriate for the precarious conditions of the farmers of the region.

Then followed a period of strong reaction especially to modern agricultural technology and a vague notion that the small farmers' own traditions were probably best for their specific environment. Although they did not adopt the extreme position of many similar groups that romanticize the past and try fruitlessly to recuperate it, the professors and students of FUNDAEC dedicated a great deal of effort trying to discover appropriateness in simplicity, low cost, intensity of labor, accessibility, and a certain quality of softness. But soon, humbled by their failures, they entered a stage of careful reflection in order to build a less simplistic framework for future-activities which, now they knew, would involve systematic search for appropriate technologies especially those related to small scale agricultural and animal production.

By late 1977, three years after the creation of the Rural University, persistent action accompanied by systematic reflection was already bearing fruits and the first set of conceptual elements of a technological framework were beginning to appear. The first decision was to avoid definitions of appropriate technology based on methods and products and focus on the process of technological progress. The appropriateness of technology is a changing quality to be understood within the broader context of a process of development with the human being as its primary concern. The needs, aspirations, resources, and capabilities of a population at a given moment, then, are important factors in determining the worth of a technology, but it is imperative that technology be also examined in light of its contribution to the expansion of the scientific and technological capacities of the population and not simply according to its cost or the degree of its sophistication. A simple and working technology, may be quite inappropriate if it leads to stagnation, and a complex one is appropriate if it is accompanied by learning so that the people can assume complete control and be able to deal with the changes that their technological choice will bring to social structures and relationships. The group at the Rural University thus began to understand appropriateness as a reflection of a population's systematic learning about its own path of development, in terms of which they were already formulating their concepts of an educational system relevant to search for a new pattern of social organization

This understanding of appropriateness in terms of the expanding capacities of a rural people, once again brought to the forefront of deliberations at FUNDAEC issues related to knowledge systems and to science. The group asserted emphatically at the beginning that technology is the application of science, and

science is to be regarded as universal, the heritage of all, independent of where and by whom each one of its pieces has been discovered. The so called modern technology is the application of science for the development of a given lifestyle, that of the industrialized nations that have emerged from a western culture and tradition. Applied within the context of a distinct set of aspirations, the same science now enriched by the knowledge of people from other backgrounds should lead to a different and more appropriate technology, helping, for example, a village to be more productive or more comfortable. Achieving this goal does not imply the rejection of the old or the new per se nor the adoption of technological innovation or technology transfer as mutually exclusive paths of development. Appropriateness cannot be determined by criteria other than the participation of a human population in the process of scientific search and the constant improvement of its ability to look for and try out solutions to its own technological problems

This definition of appropriate technology in the context of the participation of a population in a search for both technological and social alternatives implies a strong change of emphasis away from gadgets and specific techniques towards an understanding of the nature and the processes for the generation and socialization of appropriate scientific and technological knowledge. The concept of technology transfer as a transplant of products, tools, and methods of those who know to the ignorant, quickly disappears and the principal focus becomes that of the advancement of that aspect of the population's culture that may be called their scientific and technological culture.

But once issues related to the advancement of an entire culture, rather than the propagation of technological packages coupled to an aggressive process of imitation, are brought into the picture, one gradually becomes aware of the magnitude of the tensions that exist between the cultures of most rural populations and the rationality of modern society whether ruled by the invisible hand of the market or by the omnipotent state.

These tensions have been the source of numerous arguments including explorations into the possibility of different sciences especially a peasant science that presumably obeys a logic different from that of western science. The FUNDAEC group, although not as naive as before on issues concerned with the universality of science, continues to assert that there exists only one science that can penetrate and utilize different knowledge systems in order to transform them continuously and cause the progress of the totality of the knowledge of the human race. The divisions that have been proposed between western and peasant science deserve consideration more as valid criticisms of a fragmented, reductionist, and highly narrow interpretation of modern science, a vision that in itself is one of the principle causes of the failures of modern science and technology to contribute to the development of a balanced and just social order.

Expanding one's understanding of science to include some of the traditional knowledge (although by no means all) as well as some of the methods of inquiry of the diverse peoples of the world is a step forward in the process of search for appropriate technologies, but does not by itself resolve some of the more practical problems. The most difficult question probably has to do with the interaction of differing rationalities that should govern the process of search for concrete technological knowledge. Profound differences in the rationality of social processes in traditional villages and the "modernized" world are not simple subjects to be delegated to academic studies of peasant economies and cultures, they have important implications that programs of rural development have to understand if they are to contribute to a socially and morally acceptable process of technological transformation. Agricultural and animal production, for example, has been carried out traditionally in most rural areas according to a logic that is different from

commercial agriculture -- the purpose of which is to maximize return on capital -- and also different from the logic of planned individual or collective production -- usually in order to supply inexpensive food for the industrialization of a nation. This does not mean that villagers do not profit of the "modern sector." What the statement implies, for example, is that most "campesino" systems of production have a logic of their own and cannot be simply discarded as backward or irrelevant.

Even though the details of a "campesino" rationality change from place to place and should be made explicit for each specific population, it is possible to identify certain characteristics common to most villagers with surprisingly diverse backgrounds and cultural traditions. The vast majority of the rural populations of the world today are highly heterogeneous: they include people engaged in traditional farming, many who have changed their ways according to the level of penetration of modernizing programs, as well as landless laborers. The lifestyle of these populations now implies a complex set of interactions with markets, the state, and a variety of private institutions. Survival under adverse conditions has taught them to adapt themselves to certain aspects of the modernization process, even though they usually tend to maintain some of their traditional concepts and procedures. Under these conditions, it is not easy to formulate a set of exact laws of a "campesino production rationality," but it is possible to identify a number of important tendencies in their technological culture.

It can easily be observed that most "campesino" populations have a tendency towards self-sufficiency. This tendency should be understood in terms of the capacity of a peasant economy to produce both for internal consumption and the market in order to reproduce the conditions of rural life and even to improve them without accepting too much dependence on the rest of the society. "Campesinos" are extremely aware of the risks to which unfavorable natural and social conditions constantly expose them. They have a tradition of optimum utilization of local resources as well as a set of traditional practices that were meant to help conserve these resources. They tend to utilize the labor of all the members of the family and to try to organize a combination of work on their own farms and those of the others. It should be understood that village production is essentially a social process that by itself involves social relations with other similar units and the reciprocal exchange of products and labor. There is a tendency among "campesino" populations to look for stability and permanence, an awareness of the value of diversity, and a complex pattern for the management of time and space.

Numerous cases can be cited to support the existence of these tendencies in the rationality of most villagers. There is the example of the farmer who faced with two production alternatives, one with the possibility of high economic return, and the other with calculated low profit, chooses the latter if it does not expose him to too many risks, natural or due to fluctuating prices. Another family decides to plant a crop not economically very promising because the daily work it requires will allow them to program their work in other important social and economic activities. Yet another example is that of a farmer who enjoying an extra abundant crop invites all of his relatives to help him at the time of harvest, paying them generously, thus decreasing considerably his monetary profits. To the technician, this is clearly a sign of irrational economic behavior; to the farmer it is nothing but a sign of solidarity he would expect of his relatives as, with the passage of time, the fortunes of every member of the extended family will suffer unpredictable changes.

A participatory process of search for appropriate technologies the aim of which is the advancement of the scientific and technological culture of a people and which implies a well measured interaction between the rationalities of the villagers and of modern science is an exciting enterprise in which the Rural University has been involved now for more than a decade. However, it is essential to emphasize

that this path of research and action is wrought with difficulties basically due to the lack of appropriate methods and the corresponding instruments. How is the participation of the villagers -- not in social and political activities but in the generation of scientific knowledge -- organized? Which kinds of experiments can be carried out on the family farms and which kind imply the existence of experimental settings under more controlled conditions? What kind of research can be delegated to individuals and families and which call for organized group action? What are the physical and organizational structures that have established and strengthened in the village and the region so that participation does not become a mistaken word for the villager's gathering of data for scientists, but a meaningful process with permanent channels for the analysis of changing conditions (rather than costly and often meaningless diagnostic studies from outside), for the formulation of alternatives, for experimentation, for the socialization of knowledge, and for the constant revision of what is being learned? While the patterns of scientific thinking for reaching conclusions from controlled experiments are well understood, how does one deal with a body of knowledge the elements of which have been gathered from experiments none of which can be considered an exact repetition of the other due to the particular circumstances of the participating experimenter?

These are only examples of questions representing a large set of methodological issues that have to be studied and answered as search for new ways of bringing about technological change advances. As it is clear from the short presentation of the learning processes and the corresponding lines of action in part II of this document, the Rural University has made some progress in this direction especially in one of its learning processes concerned with search for alternative systems of small farm production. The challenges are, however, rather formidable and can only be met by a community of individuals working in hundreds of organizations such as FUNDAEC, each intimately involved with one or more specific rural populations. FUNDAEC has argued for the past few years that the nucleus of such a "scientific community" already exists in an increasing number of organizations that are bringing together scientific capacities and the ability to work effectively at the grass roots in the village. Others have subsequently contributed to this argument and have helped elaborate a plan of collaboration which constitutes the basis for the creation and the operation of the Latin American Center for Rural Technology and Education, CELATER.

C. Some Principles of a Rural Educational System.

The development concepts adopted by FUNDAEC have been described in the previous sections in terms of two elements: knowledge and structure, both corresponding to processes of individual and social life in a rural region. It is understood that the participation of the people in the establishment and the strengthening of each structure implies an important educational component aimed at the development of new capacities in order to apply the results of learning and to manage the forces that are generated through higher and higher levels of participation. But as mentioned before, the Rural University has also dedicated a great deal of effort to the development of a formal educational system specially suited for rural areas. Within this context, FUNDAEC has argued that the skills, instruments and disciplines of traditional educational systems are not directly applicable to the conditions of most rural people: they address the reality of other societies and other historical situations, with careers and professions being chosen on the basis of academic tradition rather than an analysis of social needs and development options.

Moreover, the natural, all-embracing structure of knowledge has been obscured by its division into disciplines, each of which has developed its own social concepts and ideology. The single discipline approach to rural development is clearly counterproductive and a superficial interdisciplinary style does not seem to constitute a reasonable alternative either.

At the time of the establishment of FUNDAEC, its founders had already lost faith in traditional rural training and in the attempts at curricular reform within the existing structure of disciplines. They had envisioned, as the first and most central responsibility of the rural university, the establishment of long-term research and action through which one could constantly identify related problems and opportunities in the region, establish the characteristics of the human resources capable of confronting these problems, and design and teach curricula for the development of the necessary personnel. They had decided that FUNDAEC's programs and corresponding curricula would change as the population advanced along its path of development and would help to shape the needed human resources according to the best available knowledge of social needs at any given moment. They had also decided that social needs would be identified in the context of a constant search for new insights into human nature and aspiration and not in terms of theoretical models of preconceived political systems. The educational programs would not be utilitarian in nature but would address fundamental intellectual and spiritual issues, not only of a single individual but also of a community and of an entire people.

The application of these concepts to the development of formal education led to a program for the training of workers in rural well-being at different levels of competence as mentioned in part II of this document. Some of the basic educational ideas will be presented directly in the context of this specific program under three headings: concepts and capabilities, form and content, and integration.

Concepts and Capabilities

The decision to create a program for the training of new type of human resources was based on an initial exploration into the possibilities of social change rather than as a response to the labor market. In fact, the mode of operation of the graduates of most programs and their possible sources of income were to be defined as FUNDAEC succeeded in setting in motion the desired learning processes within the population of the region and in generating some of the necessary social forces. Under these circumstances, to describe the desired characteristics of the graduate and to establish the corresponding educational objectives represented a difficult challenge. Task analysis has often been used to determine the objectives of training courses, but it is a method more suited to reform of curricula of existing careers. FUNDAEC intended to do far more than reform; it hoped to develop new fields of action, searching for the content of a truly rural education with a high standard of excellence.

Faced with the inapplicability of current methods of curriculum design, the professors of the Rural University finally decided to define curricula by general categories only, concentrating on the creation of content as well as objectives through a series of consecutive approximations. They felt that the widespread fashion of defining educational activities in terms of narrow and precise objectives leading to a rigid programming of learning, was unsuitable for their endeavor. They wanted to avoid limiting, a priori, the capacities of their students, so much so that some activities would be specially designed in order to confront students with situations as yet beyond their learning capacity and knowledge. Years of teaching experience had shown the FUNDAEC professors how their conventional university

students, accustomed to comfortable definitions and well-defined situations, were at a total loss when confronting the complexities of the search for new knowledge or when looking for solutions to problems under real conditions. Besides, the entire group was process minded and was rebelling against what was considered to be undue emphasis on hypotheses and objectives, results of a narrow interpretation of the methods of science. The professors of FUNDAEC were determined to pay attention to the art of teaching as well as the science of education.

To define the general categories and divisions of the desired curriculum, the professors began by analyzing the content of the Colombian educational system and examined existing texts, especially those widely used at the high school level. Their findings convinced them that the system, in addition to being socially irrelevant, was failing its pedagogical objectives as well. An educational program's goals should be to endow students with appropriate concepts, skills, capabilities, and attitudes, as well as to impart facts and information. The existing system had seemingly concentrated on presenting a succession of facts and formulas and had succeeded in developing, at best, a few useful skills in the students. The FUNDAEC professors decided, then, to structure the new curricula in terms of concepts and capabilities rather than simple skills and information. In fact, they overemphasized concepts during the first years, with the resultant criticism that "philosophers of rural well-being" (probably a respectable profession in its own right) were being trained rather than practical workers. Subsequent revisions of curricula sought a more desirable balance between facts, skills, and concepts.

For the specific case of this first educational program, it was finally agreed that the concepts and capabilities necessary for generalist workers in rural well-being fell into five basic categories: mathematics, sciences, language, crafts and technology, and service to the community. The categories do not cover the whole spectrum of possible human capabilities but the curriculum under consideration is not the only one to be developed in an effort to educate human resources for rural development either. It is important to mention here that the five areas of curriculum do not refer to content of disciplines but the capabilities that students are expected to develop during the course of their studies. Thus a unit in the area of mathematics may have as its content the analysis of the conditions of health in a village; belonging to the area of mathematics means that its main thrust is the application of fractions and percentages as health indices and rates, and that its main purpose is the development of needed mathematical abilities in the context of a real and significant social problem.

The curriculum under question has evolved through many repeated applications but has never changed its emphasis: the in-depth understanding and development of the student's attitudes and capabilities. The reward has been a surprisingly accelerated teaching-learning experience which most critics of the program had considered well beyond rural youth deprived of all the stimuli deemed necessary in many of the current educational models. The lack of emphasis on the deeper qualities of the human mind in some of these fashionable practices continues to puzzle the scientists and professionals of FUNDAEC; it can be understood only as yet another symptom of the gradual disappearance of the human being as the basic concern of planners and planning offices. Hundreds of vague indices and numbers, measuring input, output, and efficiency, can be registered on paper and tapes; machines can be made to do things and increase the efficiency of a system; but attitudes and capabilities have to be developed in human beings.

Form and Content

How to impart their educational message was also an important concern of the originators of FUNDAEC as they embarked on their ambitious educational project. Technology was in vogue in education at the time, but the group felt that there was too much emphasis on form rather than on content in most programs of curricular development. The textbooks used in the Colombian system had become more colorful during the previous decade. Convenient formulas and conclusions were presented in neatly arranged boxes on the appropriate pages. In schools of education, courses were being taught in the use of audiovisual gadgets, programming, and organizing time and space. Above all, everyone was learning to formulate objectives. The objectives that were being formulated were excellent and based on the most advanced educational theories, yet the message, the content of the educational material, continued to be the same. There was no correspondence, and there is still none, between the most impressive set of objectives for the education of children and youth and what is taught in the classrooms in Colombia. As far as rural education is concerned, the content is urban, dogmatic, fragmented, rigid, and superficial. It dissociates the students from nature and the reality of their surroundings, includes few social, moral, and spiritual teachings, and contributes little to the development of creativity. No matter how much technology is used in presenting this message, it continues to lead to rote learning, to superficiality, and to intellectual boredom. Within this context, it was imperative that FUNDAEC would dedicate itself to the search for new contents, even if the form continued to develop at the margin of modern technological innovations.

The decision not to introduce many modern educational aids into the program was not a rejection of educational technology per se. The members of the FUNDAEC group were not denying the usefulness of technology; they simply asserted that the form followed the content and was not an end in itself. In fact, almost a decade later, once the innovation in content proved successful, FUNDAEC's staff did begin to look for technology to make their system more efficient and capable of serving a larger number of students.

On the other hand, the changes in form that gradually were brought about were mostly related to the teaching-learning experience itself. The search for a valid rural education implies changes in the relationships between many of the elements of the educational system-time, space, students, teachers, school, and the community. For example, the relationship between the students and the professors in the programs of FUNDAEC is one of co-workers embarked on an enterprise of great importance-the search for the path of development of their people. The student is not considered an empty container to be filled drop by drop but a mine of hidden talents and potential that need to be discovered, perfected, and directed toward the service of others. The method of teaching, reflected in the design of textbooks, is one of raising questions and trying to find answers in an atmosphere of consultation between teachers and students.

The principle of participation, so essential to the concept of the Rural University, governs the educational activities as well. Participation is treated as a process to be achieved as the students develop their capacities, and democracy for its own sake is not given undue importance. The purpose is to increase participation without denying the special position of the teacher who has access to much more knowledge in a specific field than the students. The teacher's role is to guide the students through the exploration of knowledge. During this exploration, students and teachers definitely do not have equal status, yet, it is made clear that the authority is that of knowledge and not of the person of the teacher. Moreover, everyone is taught that the authority of so-called scientific knowledge is not absolute either.

The first step to achieve participation is to convince the students that the weight of the teaching-learning experience is on their shoulders; they, not the teacher, should be the active agents. This is not an easy task in Colombia and, for youth who have had contact with the school system, involves unlearning a number of negative attitudes and customs. The whole context of FUNDAEC, however, has proved to be extremely effective in helping to achieve this basic understanding, which once firmly established allows students to move quickly to active participation in planning, elaboration of schedules, supervision of activities, and even revision of the content of some of the courses.

Integration

Many of the principal characteristics of the efforts of FUNDAEC in its first decade have been, in one way or another, related to the concept of integration. In the early years, the group was trying to add new elements to the concept of integrated development; in education too, one of the central issues was how to achieve curricular integration.

Attempts to create integrated curricula are, of course, not new and the professors who established FUNDAEC were aware of many efforts to bring together knowledge pertaining to different but related disciplines and create a more integrated content. In general, the approach has been to choose a discipline, an activity, or a theme as an axis around which a unit of instruction is prepared. The reasons for this kind of integration are purely pedagogical and are based on assertions indicating that a child learns more if reality is presented in an integral way: that an integrated course of science achieves more than one divided into separate disciplines, or that it is clearly better to teach history, geography, and other related subjects together. For FUNDAEC, the issue of integration was more essential than its implications for the enhancement of learning; it was to be a key to solving a number of conceptual and practical problems.

The initial deliberation of the FUNDAEC group had convinced them early during their joint experience that the division of knowledge into disciplines has been given undue importance in this period of human history marked with technological progress and increasing specialization. It is not an exaggeration to say that the division into the present set of disciplines is almost seen as inherent to knowledge itself, which is defined in terms of its fragments, as a sum of all the-disciplines in natural and social sciences, arts and humanities, and professional fields such as engineering or medicine. Yet, "knowledge is one" and its division into disciplines is nothing more than a result of the finiteness of the human mind. The choice of divisions, however, is not a consequence of pure human thought and meditation; it is strongly affected by ideology and social conditions. The way a Western university is organized in departments dealing with defined disciplines reflects a style of life, a social ideology, and historical realities of a people, as well as being a convenient division of knowledge to be grasped by individuals of different talents and inclinations. Therefore, when a population establishes such a structure for its educational system, it is buying more than knowledge; it is making definite statements about its future social organization.

In practice, the Western structure of specialized training is facing a crisis as it tries to solve the problems of the developing-countries. The most conventional answer seems to be the creation of interdisciplinary groups, the adding of experts to form a wider field of expertise. As useful as this may be, it is only a partial step toward integration and is not an answer to the problems of the fragmentation of societies reflected in their defective educational systems.

The frontiers of disciplines, of course, are not fixed in materially advanced societies where modern university models are originating. When new problems emerge, often new disciplines are created. However, seldom is the movement toward integration and generalization. The tendency, with few exceptions, is toward concentration on narrower and narrower fields and problems. At a philosophical level, one could argue against this tendency and relate it to some of the evils of modern society, but, at the time, the individuals forming FUNDAEC were not concerned with such arguments: they were trying to face concrete problems and create educational programs relevant to the future development of a specific population. The curricula taught at the universities in Colombia-transplants from universities in other countries-were not preparing individuals to be capable of solving the problems of the small farmers or, for that matter, any other section of the majority of the population of the country. The graduates of these universities were taught to function within a different society which was presumably being built, but to which only a small minority could belong. To the organizers of FUNDAEC it was clear, then, that new curricula should not be developed from sums of disciplines of professional programs designed for other social realities and that they had to find new ways of understanding the problem of integration.

The approach finally adopted was to give a broad meaning to the concept of integration in curriculum design: to define it as a process of fusing relevant elements from the universe of knowledge for programs of education with a definite and clear purpose. The purpose in itself was not to be based only on pedagogical considerations; the curriculum should be integrated to support a social purpose. FUNDAEC was founded for the specific purpose of improving the well-being of local communities; the same purpose became the basic guide for curriculum integration. The axis around which an integrated curriculum would be built, then, rather than a theme, activity, or a subject matter, was service to the community. Within each one of the five areas of the curriculum a number of units would be (and were) developed each concerned with a small number of related capabilities, which would present a discussion of the corresponding concepts, provide the necessary information, and suggest activities to acquire and sharpen skills. In their totality, these units would present a pattern of thinking, attitudes, and behavior to be followed in a sequence of research-action-learning activities in a closely examined and continuously adjusted path of service.

An educational program with a definite and explicit social purpose creates an atmosphere radically different from what is prevalent in most educational systems. The purpose encourages activities that integrate and apply knowledge and, therefore, motivate and facilitate learning; it also shapes the attitudes of the professors and the students. Although, in FUNDAEC's system, the students and teachers are still interested in improving their social and economic status, this desire diminishes in importance and occupies its proper place within a far greater vision of collective progress. To assert that professors and students of high schools and universities do not have positive social attitudes, and attribute much of the educational crisis to lack of motivation, may be valid for many systems of education. However, such an assertion must be analyzed in light of the relevance of education and the fact that the programs offered in most educational systems do not contain any valid social purpose.

In the specific case of the curriculum for the training of workers in rural well-being, the explicit social purpose of the program expressed in terms of service to the community has also helped to solve another challenge of integration: having transcended the usual dichotomy between theoretical and practical knowledge. It has succeeded in developing in the students specific skills and the capacity to deal with abstract concepts within the same set of educational activities. This represents significant departure from most current educational systems that tend to provide

practical and manual skills for some, book-learning for others, the capacity to participate in planning and decision-making for the few, and training to carry out orders for the majority. A definite accomplishment of the textbooks of FUNDAEC is their ability to maintain the interest of the students in parallel concrete and abstract activities-in the skills for raising chickens, for example-, and the study of animal physiology, or in actions leading to the establishment of a village store and in the analysis of abstract social and economic theories. In general, constant reference to the real problems of the rural communities has helped everyone to place things in perspective; prejudices and a false scale of prestige have slowly disappeared and a single purpose of learning what is needed to bring about social change has taken their place.

But the real challenge of a process of curricular development in tune with the educational concepts of the Rural University is not so much the fusion of elements of knowledge, but the integration of material and spiritual elements into a knowledge system that would enable individuals and entire populations to contribute to the creation of a new social order. Years of experience have now confirmed the initial conviction of the FUNDAEC group that substantial and sustained improvement in the material conditions of the majority of humanity can only be the fruit of a profound spiritual transformation, for it is within the human soul that social and moral disintegration is producing its most devastating effects. The sophisticated terminology being used in different disciplines to teach people about human behavior represents after all useless attempts to avoid an old and fundamental question: "Are human beings simply a complex combination of physical elements driven by selfish desires, whose behavior is already determined by the laws of the material world? Or do we possess a higher nature that, if developed, will free us from ego and bring forth those noble characteristics which are indispensable for the fulfillment of the purpose of our existence? The two most cherished fruits of the first view, in this century, have been the consumer society on the one hand, and slavery to the state under a totalitarian regime on the other. To rebel against these dominant ideologies and identify FUNDAEC as a spiritual movement is easy, but what this means in practice is not so straightforward if one wishes to go beyond the level of customary rhetoric and contribute significantly to the construction of an alternative conceptual framework for the science of education.

It is not difficult to argue that, in spite of great scientific and technological progress, human and moral development has been neglected in the field of education; while hundreds of experiments try to discover how to teach a child a mathematical concept or a scientific fact, few have ever looked with the same scientific rigor for educational activities that !Pad, for example, to integrity, social responsibility, or rectitude of conduct. The portions of existing curricula designed to edify human character actually contribute to fragmentation, for they separate the discourse on the inner conditions of the individual from every other aspect of importance in the life of a person or a community. Materialism, a most fanatic and intolerant religion, has persistently driven spiritual issues farther and farther away from the mainstream of intellectual activity. Education is materialistic (even in the case of some religious institutions), and educators have given lip service to "human development" in isolated courses of dogma, ritual, or ethics. But, in most societies, propaganda is the strongest force shaping the human character. whether it comes from the producers of goods and services or from dominant political parties. Meanwhile, the community of educators, in its great zeal to become "scientific," has been preoccupied with psychological games and the mindless application of sophisticated technology.

What FUNDAEC has tried to do in order to face this challenge is not the development of specific courses in religious dogma or their humanistic

counterparts, ethics or social behavior. Spirituality is treated as a state, an inner condition that should manifest itself in action, in every day choices, in profound understanding of human nature, and in meaningful contributions to community life and to society. Following this interpretation, spirituality has to be integrated into every educational activity: every act has to be a context for the clarification and the application of spiritual principles. In such an educational practice, material well-being is not denied and prosperity is not relegated to another life; rather, every day activities, carried out in the spirit of service to humanity, are elevated to a more sublime station, rejecting at the same time asceticism and reclusion as requirements of a spiritual character. But spirituality is not restricted only to actions that lead to material well-being, and the manifestations of the most profound yearnings of the human soul, such as the search for nearness to God through prayer and meditation are also given due recognition.

In this context, then, the category of educational practices that have presented the greatest challenge to the professors of the Rural University are those concerned with the development of a delicate balance among the many forces that work in the human mind and heart: balance between personal liberty and social obligation, between being the teacher or nature and living in harmony with it, between humanism and science, the physical and the spiritual, the rational and the emotional, and, in general, balance among a large number of spiritual qualities that each in its extreme can lead to fanaticism and have to be developed simultaneously so that they can modify each other-justice, love, rectitude, compassion, humility, confidence, and trustworthiness.

Even though outside observers have credited FUNDAEC for having made considerable advances in achieving the goals of integration in this more profound sense, for the group itself, their accomplishments are rather insignificant when compared to the enormous task that lies ahead in the field of education as old social and mental structures disintegrate and a new and vigorous system of values is established for the development of a new world order.

http://www.fundaec.org/en/institution/celater_doc.htm