The field schools in the national institute of forestry, agricultural and livestock research

As escolas de campo do instituto nacional de pesquisa florestal, agrícola e pecuária

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ABSTRACT
One of the objectives of the National Institute of Forestry, Agricultural and Livestock Research (INIFAP) is to promote and support the transfer of forestry, agricultural and livestock knowledge and technologies, according to the priority needs and demands of producers and society, as well as How to contribute to the training of human resources. To achieve this goal, according to Cadena et al 2015, INIFAP has implemented 14 technology transfer models, from those linear schemes from abroad, to participatory methods, such as the Livestock Groups Technology Validation and Transfer model (GGAVATT) and Experimental Producer, among others. He highlights that, in the southeastern region of Mexico, a paradigm shift has been marked with the Field Schools. Regarding this last model, this article describes the process by which the INIFAP research staff began to use the Field Schools model in the training of technicians and producers and the process of methodological adaptation to be used as a model of training, as well as some experiences of its use in different entities and contexts, and finally the perspectives that are displayed with its application.

Keywords: field schools, training, extensionism, technology transfer.

RESUMO
Um dos objetivos do Instituto Nacional de Pesquisa Florestal, Agrícola e Pecuário (INIFAP) é promover e apoiar a transferência de conhecimentos e tecnologias florestais, agrícolas e pecuárias, de acordo com as necessidades e demandas prioritárias dos produtores e da sociedade, bem como Como contribuir para a formação de recursos humanos. Para atingir este objetivo, de acordo com Cadena et al 2015, o INIFAP implementou 14 modelos de transferência de tecnologia, desde aqueles esquemas lineares vindos do exterior, até métodos participativos, tais como o modelo de Validação e Transferência de Tecnologia de Grupos Pecuários (GGAVATT) e Produtor Experimental, entre outros. Ele destaca que, na região sudeste do México, uma mudança de paradigma foi marcada com as Escolas de Campo. Sobre este último modelo, este artigo descreve o processo pelo qual o pessoal de pesquisa do INIFAP começou a utilizar o modelo das Escolas de Campo na formação de técnicos e produtores e o processo de adaptação metodológica para ser utilizado como modelo de treinamento, bem como algumas experiências de seu uso em diferentes entidades e contextos e, finalmente, as perspectivas que são exibidas com sua aplicação.

Palavras-chave: escolas de campo, treinamento, extensionismo, transferência de tecnologia.

1 INTRODUCTION

At INIFAP, support activities for technology transfer have focused on holding demonstrative events where research results are presented, and validations of various technologies. These events are held in the experimental fields or on the land of the producers, where the results of the work carried out are shared, with little or no participation from the producers. The Field Schools method is related to INIFAP, through the participation of the first author in the Sustainable Slope Management Project (PMSL) in the state of Oaxaca, from 2000 to 2005, under the coordination of the Colegio de Postgraduate (COLPOS), with financing from the World Bank. The PMSL was a pioneer project in the study of carbon sequestration, as an element related to global climate change.

The participation of the INIFAP staff was to promote the adoption of the Milpa Intercropped with Fruit Trees (MIAF) technology, identified in the project, as the technology with the highest levels of carbon capture, the training and technology transfer model to be used It should be of a participatory type, considering the indigenous context, characterized by elderly producers, over 60 years of age, and with little or no schooling (León and Jiménez, 2000). Therefore, it was decided to implement the Field Schools method (Morales and Galomo, 2006). Braun et al, (2006), document that the Field

Schools were developed in the eighties, in Indonesia, as a response to serious losses in rice cultivation, caused by pests and natural enemies of the crop.

As a result of this, the Field Schools were implemented to improve the analysis and decision-making capacity of the producers, seeking to break the dependence on pesticides. A central element in the methodology emerges from this model, such as the training of promoters, originating from the communities to work with the producers in their own communities, something similar happened when it was replicated in the Mexican Republic. (Morales and Vázquez 2015; Cadena 2015).

The term "Field Schools" is based on the "learn by doing" approach, that is, together with theoretical information, high importance is given to field work, where an exchange of experiences, knowledge and knowledge among the participants (Escobar, 2012; Gallagher, 2003). This principle is typical of andragogic processes or adult training in informal settings where action is privileged in the process and the teaching-learning process is carried out by doing or putting into practice what has been learned. Androgogy plays an important role in the field school model, since when working with rural producers, it is usually done with adults, who require teaching-learning processes in informal settings and Androgogy is precisely that, education of adults in informal settings. It is a set of teaching-learning processes and techniques aimed at training adults, usually outside the classroom, unlike pedagogy, which is the teaching of young people and children in formal settings and usually within a classroom. In the andragogical process, the producer is considered the central axis of the Field School, as an entity, conscious, free, responsible, autonomous, creative and committed. The analysis and reflection of the processes and relationships are privileged, conversations are carried out in an effective and meaningful way, without hindering and imposing. In the process there is not one who knows and another who learns, but it is an experience where we all learn from each other mainly by doing things, what some have called sharing knowledge, one learns from the other, in a reciprocal process, FAO mentioned as the transmission of knowledge from peasant to peasant. (Axiin, 1993).

With these antecedents, a methodological adaptation to the conditions of the indigenous populations of Mexico was carried out. In 2007, the Field Schools manual for training and technology transfer was published. The steps established for the training are based on three moments; a) Theory; It is a part of the courses, which is shared with the producers, pointing out the background of the technology, its fundamentals, the materials that are required and the process for its elaboration. It is suggested that this part be no

longer than one hour in length. b) Practice; It is the central part of the training model, it is based on the option of learning by doing, where the aim is to ensure that all attendees participate in the practice. c) Reflection – agreements; This final phase deals with the rapid evaluation of the practice carried out, but above all it seeks to reach agreements for the replication of the practice by the assistants, as well as the accompaniment of the technician in their plots.

As of 2007, actions were developed in the Mexican field, which allowed making other methodological adjustments to the work model, and advancing in the elaboration of a proposal that presents the Field Schools, as a model of training and technical support. for agricultural producers (Morales et al, 2015). The referred model specifies the technical support strategy and the training process in the field with the learning-doing approach. Subsequently, Cadena et al; (2012); Cadena et al., (2018); they implement the methodology of the Field Schools in a project where they are involved in addition to the technological offer, the added value or the business plans for the producers. As part of the strategy to disseminate the method, the Field Schools were included in an approach to serve the highly marginalized areas of the south-east of Mexico, with outstanding results given that the producers became empowered by the method and proposed from their own resources. and context. the creation of agribusinesses, based on the transferred technologies, later this work methodology was taken to the countries of Paraguay, Nicaragua and Brazil, where work programs were implemented.

2 MATERIALS AND METHODS

In the Mazateca, Cuicateca and Mixe indigenous regions of the state of Oaxaca, in the period from 2000 to 2005, whose characteristics are; indigenous population, few speakers of the Spanish language, little or no schooling and advanced age (León and Jiménez, 2000), it was decided to carry out the work of methodological adaptation of the Field Schools, the above, was done through work with 24 community promoters in the same number of communities, with the participation of 280 producers, from the Mazatec, Mixtec, Nahuatl, Mixe and Cuicatec ethnic groups (Morales and Galomo, 2006). The work method carried out emphasized two central aspects, with a practical orientation, rather than theoretical, based on the process of "learning by doing", as well as actions with an emphasis on the preparation of producers as promoters of the new technology, taking responsibility for working with producer groups in their communities.

The information on the beginnings of the Field Schools in INIFAP is presented as a bibliographic description, complemented with the experience of the authors, as key actors in the process. While the application of the model is presented citing the experiences and the main results based on degrees of technology adoption among producers from different communities. The information is presented in three chronological sections; Beginning of the experience (methodological adaptation), application of the model and its perspectives.

3 RESULTS AND DISCUSSION

3.1 BEGINNING OF THE EXPERIENCE (METHODOLOGICAL ADAPTATION).

The methodological adaptation work was carried out with the participation of 24 Mazatec, Cuicatec, Nahuatl, Mixtec and Mixe indigenous producers, under the figure of promoters, from 2002 to 2006, which allowed integrating the first version of the Field Schools in INIFAP, which was published in the Manual of Field Schools for training and technology transfer (Morales, 2007). For the application of the Milpa Intercropped with Fruit Trees (MIAF) technology, work groups were formed in the communities, which were trained with the Field School method, under the direction of the project's technical team and the promoter producers. In the case of the Mixe region, characterized by its high levels of indigenism, 100% of the training was provided by local promoters in their native language. While in the Mazateca region it was 66%. This situation of the use of native languages would not be possible with technicians from outside the communities (Morales and Galomo, 2006).

Regarding the use of the technological components promoted in the first stage of methodological adaptation, the producers who are members of the working groups applied 53% of the components of the MIAF technology, while the promoting producers applied 62% of the components. . Among the technological components adopted, the correct use of fertilizers stands out, as well as the elimination of the practice of burning stubble on the land, which helps conserve moisture and improve nutrients in the soil. On the methodological level, this is; how to do the Field School sessions, with the information obtained in the bibliography and the suggestions of the members of the Red AC Organization, the training sessions were structured on a monthly basis, initially two-day sessions were held, later it was necessary to adjust it to a single day, due to the commitments of the promoters in their field activities. The work program in this stage began with the review of the agreements of the previous meeting and the report on the

activities of the promoters in their communities. Once this stage was covered, the training was carried out with the theme defined in the previous session. For this purpose, the theoretical part was first developed in a room lasting no more than one hour, then the transfer to the plot was made. for the corresponding practice, with the characteristic that it should be practical and without a time limit, ensuring that all promoters participate in the process. In practice, technological components are included for the production of milpa and fruit trees, as well as ecological issues. In the final phase of the training sessions, an analysis activity is developed, called study circles, referring to issues of personal motivation, as well as the evaluation of the session carried out (Morales and Galomo, 2006).

With the learning from this phase, the "Field Schools Manual for training and technology transfer" (Morales, 2007) was integrated, which served as a reference for the following stages in the learning process of the Field Schools. Model Application Starting in 2005, the scaling stage began towards other municipalities in the Mazateca, Cuicateca and Mixe regions, as well as other regions of Oaxaca, such as the Sierra Norte, Costa, Sierra Sur, Mixteca and Valles Centrales, all in the state of Oaxaca. The model of Field Schools was also applied in the states of Guerrero and Chiapas. The results of some studies on the adoption of different technological components of the MIAF are presented below.

Orozco et al, 2008, in a comparative study between participating and non-participating producers in the methodological adaptation, considering the initial and final stages of the training process, found that the participants began with an initial adoption score of 8 and ended with 70 points, this is 62% adoption by Learning Field Schools. While the non-participants, they showed an initial adoption score of 8.2 and ended with 8.6 regarding the knowledge about the promoted technology (MIAF). It is assumed that the results were achieved because the Field Schools provide experiential learning and facilitate the exchange of experiences (Orozco, et al, 2008).

Gaytán et al, 2008, developed a study to find out the contribution of Field Schools to producers in the training and dissemination of MIAF technology. The results indicate that the Field Schools are an educational means to inform, interest, accept and adopt technologies. Most of the producers communicated the innovation to friends, relatives and neighbors when interacting in the practice of work exchange or "hand turn" (40%). Another important means of disseminating the technology was among the day laborers hired by the producer to attend to his plot with MIAF (36%). A relevant figure of the

model is the promoter producer, according to the study, more than half of the producers (60%) were trained with the promoter producer, this group received training in the local language, which facilitated communication and learning, especially among producers who only speak local languages. The producers considered that the advantages of the promoters compared to the technicians were that they were always in the communities, to resolve the doubts of the producers (69%), ease of communication with the producer in the local language, and for the use of concepts and symbols that both know (52%). The general adoption of the MIAF technology components was of the order of 63% of them.

Ruiz et al, 2012, In a study in the Mixe region of Oaxaca, to learn about the adoption of technological components of the MIAF, it was found that 50% of the producers adopted practices such as pruning, grafting, drawing contour lines and the non-burning of residues for planting, 33% of the producers adopted the fertilization of the fruit tree and pest control and the new topological arrangement of the milpa. Outside the context of methodological adaptation, the model was used in two research projects financed by the National Council for Science and Technology (CONACYT), in maize and commercial crops, as pointed out by Ortíz et al 2013, who carried out an investigation to determine the level of adoption of different technological components for the production of tomato (Lycopersicum Esculentum) in greenhouses in the Sierra Sur of Oaxaca. Of 71 technological components promoted in the Field Schools, the producers adopted 46% of them, that is, they went from an adoption rate of 18% to finish with 71%, soil disinfection, pesticide management and production of plants in trays.

In the production of corn in the town of Tlalcozotitlán, municipality of Copalillo, Guerrero, it was possible to increase the production of corn, from 0.9 t ha-1 to 2.03 t ha-1 with the components of incorporation of mycorrhizae, organic fertilizers, topological arrangement , pest control with pheromones and plant extracts and mineral broths (Noriega et al, 2019). In Mexican lemon, the training method was applied to improve the profitability of the integrated lemon management system in the state of Guerrero, which involved the use of improved and certified plant components, training and rejuvenation pruning, health and fruiting, balanced chemical fertilization, flowering induction, pest and disease management, achieving 88% adoption of these components, with higher adoption in pruning and fertilization (Vásquez et al, 2020).

The training model has also been applied in backyard vegetable production. In the community of San José del Carmen, municipality of San Cristóbal de las Casas, Chiapas, various technologies were promoted, such as double excavation biointensive beds,

preparation and use of bocashi fertilizer, planting species such as cabbage (Brassica oleracea L.), lettuce (Letuca sativa) radish (Raphanus sativus), onion (Allium cepa), carrot (Daucus carota subsp maximus), beet (Beta vulgaris) and coriander (Coriandrum sativus) testing different associations and crop rotations, preparation and use of vegetable extracts, placement of attractive traps for pests, as well as a rainwater harvesting system and its management system. The achievements of the training refer to the increase in the volume of vegetable production, 88% with respect to its initial production, as well as the diversification of species. 94% of the production was for self-consumption and the rest for sale in the same community (Martínez et al, 2019).

In the state of Guerrero, the technologies promoted included the establishment of seedbeds, a shade house with Agribon fabric, the production and application of agroecological fertilizers, the production and use of Bordeaux mixture, ash and calcium sulphide broth, installation of a drip irrigation system, yellow traps with adhered oil for pest monitoring and control, fertilization with compost and bat guano. With the training of Field Schools, the production of vegetables increased by 120%, from 1.0 kg/m-2 to 2.2 kg/m-2 (Vásquez et al, 2019). In the case of tomato and onion production, most of the production was marketed, which contributed to the income of the participating families (Vásquez et al, 2019).

3.2 PERSPECTIVES

Based on the results obtained by the application of the Field Schools method, in terms of the adoption of technology, and the relevance that it has represented in INIFAP, when considered as one of the main contributions in the 35 years of the institution (INIFAP , 2020), currently working on the validation of a rural extension method based on Field Schools, through the concept of technical support to producers, as part of a continuum with the training process, that is, after to the development of the training sessions, the realization of the replication of the practice is promoted, later the field technician accompanies each producer in his plot, to be present in the realization or application of the technology that corresponds to the training carried out in the replication, in such a way that, being present and supporting the producer in practice, you can know if the producer is correctly performing the technology, and support it in the necessary aspects.

4 CONCLUSIONS

The Field Schools training model has demonstrated its efficiency in the adoption of technology in different crops and contexts.

The Field Schools model has been accepted as a useful technology transfer strategy at INIFAP.

The use of the Field Schools as a model of rural extensionism is feasible, for the empowerment of the target groups and the appropriation of knowledge through the use of andragogic methods in its implementation and its replication among the same producers

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