Environmental learning in adolescents from a Mexican community involved in forestry

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Introduction

Environmental problems generally stem from social problems (Iozzi 1998). A telling example is the loss of forest cover in many wooded regions owing to the expansion of farming. This is the community’s way of overcoming hunger and improving their economy in the short run. Yet one of the greatest obstacles to forest conservation lies in the attitudes, values and lifestyles of the social actors who are dependent on the forest for their livelihood.

Mexico is one of the few countries in the world where rural communities have extensive managerial control over forests (Bray and Merino 2004). The wooded area amounts to almost 57 million hectares (Segura and Rodriguez 2004) where 8,420 indigenous communities live. Common land and farming communities in indigenous municipalities own 60 per cent of the forests, which are mainly temperate or humid and sub-humid forests (Comisión nacional para el desarrollo de los pueblos indígenas 2005).

White and Martin (2002) point out that community management in Mexico is 20 years ahead of the international trend to restore the collective ownership or control of forests. Nonetheless, in many Mexican rural communities, forest management is scarce and of poor quality (Rodríguez Zúñiga 2003), which contributes to some of these being amongst the poorest and most marginalised in the country. This situation is, in part, due to the lack of forest management plans tailored to the social and environmental context of each community.

One of the major Mexican forestry production states is Michoacán, located in the west of the country. Yet, in 1998 only 10 per cent of forests had management plans (Secretaría de medio ambiente y recursos naturales 2002). The solutions and opportunities proposed to improve this state of affairs are mainly political and educational. They are, on the one hand, to implement viable government programmes to promote the proper management of forest resources and to facilitate the development of communities able to set up community forest enterprises. On the other hand, they involve increasing local participation in the decision-making processes and raising awareness so as to generate more interest in forest management and to foster a change in the lifestyles and values of those who work this asset.

A sound strategy for success with many of these actions lies in education for sustainability,
which aims to have education geared to more participative practices and to empower indigenous communities politically to manage their own resources. We are currently launching the UN Decade of Education for Sustainable Development (2005–2014), proposed in 2002 at the Johannesburg Summit, which seeks to transform formal and non-formal educational sectors worldwide by redirecting educational policies and practices to promote the following aspects (Food and Agriculture Organization, 2005):

- environmental quality, social equity, human rights and peace,
- critical thinking to foster reflection and discussion,
- active participation of the pupils themselves,
- inter-disciplinary learning.

The state of Michoacán is one of the three Mexican states that exhibit the biggest educational deficit (Soria and Regalado, 2005). This backwardness is measured in terms of education enrolment and drop-out rates. Almost 80 per cent of all municipalities exhibit average and very high rates of marginalisation (Soria and Regalado 2005). The teaching issue is, moreover, one of the problems that has held back improvements to the quality of education in the state. Formal education still advocates unsustainable values and practices in society because it seeks to promote competitiveness and consumerism instead of cooperation and conservation (Barraza 2002). The current educational plans raise the following problems as regards the study of the local environment (Comisión estatal de ecología 2004):

- The time devoted to specific content related to environmental matters is small compared to the overall curriculum.
- The presentation of problems related to resource management seems to be solely theoretical, explanatory and informative.
- There is little concern for the study of the local environment and teachers are ignorant of innovative teaching methods because they lack training and professionalism.

In the Michoacán rural setting the situation is made even worse by huge educational deficiencies that have given rise to high levels of ignorance and illiteracy among the population, leading in turn, to the inadequate use of forest resources and hence, environmental degradation. These shortcomings stand in the way of establishing productive linkages between schools and the local natural, social and cultural conditions of Michoacán forest community children and young people (Centro de estudios para el desarrollo rural 1998).

Despite these shortcomings, schools have the wherewithal to introduce participative projects (Paré and Lazos 2003) that could connect pupils to their parents and the community at large and also to their forest resources managers. This educational process will have to be from the bottom up so as to convey the concerns, ideas and concepts of adults as to what is needed to conserve the forests where they work. In turn, revisiting the teacher–pupil relationship implies recognition that pupils’ experience as well as those of their parents and the wider community inform the cultural narratives of who one is, what one is and where one is (Centro de estudios para el desarrollo rural 1998).

It is essential to work on and strengthen personal identity in rural schools, especially in high school, since this is the highest level of formal education in these communities. It is thus necessary to establish whether high school curricula and syllabuses are linked to the forest management activities carried out by these communities. It is also necessary to ascertain whether the knowledge and opinions of adults on their work in the community forest enterprises are being handed down to young people.

To achieve this, educational policies committed to rehabilitating, training and instilling environmental values and practices in the young population are needed to help build processes of local sustainability.

The complexity of the social, economic and political aspects of these issues calls for initiatives based on education for sustainability and rooted in the analysis of specific contexts (Barraza et al. 2003). This piece of research looks at the indigenous community of San Juan Nuevo Parangaricutiro in Michoacán, which is one of the state and national community forestry success stories since the consolidation of its community forest enterprise in 1981. The forest is managed according to a forest management plan based on a complex social and ecological system comprising a host of social, institutional,
political and economic interacting actors. Furthermore, it has won international recognition for the sustainable management of their forest asset.

The success achieved is such that this community knowledge on conservation and exploitation practices must be handed down from generation to generation. What adolescents can learn about environmental issues is closely predicated on the teaching methods used in school and by the parents who work for the forest enterprise and the broader community (Barraza 2003). Nonetheless, successful community forest policies are not being factored into the curricula designed for community young people.

In this research project, the influence of high-school education, the home and the San Juan Nuevo forest enterprise as centres of teaching and learning on young people in the community was analysed. A study was made of the relationship dynamics and the contents of their formal and non-formal education systems in terms of the knowledge and attitudes of adolescents towards communal forest management. From the results, specific proposals intended to enrich the environmental and local content of the high-school curriculum emerged through a participative process involving young people, community representatives and the education authorities.

Methods

Place and subjects of the study

The indigenous community of San Juan Nuevo Parangaricutiro is one of the 100 farming communities registered with the state of Michoacán (Secretaría de la reforma agraria 2005). It has a population of about 15,000 inhabitants and its economy is mainly based on its enterprise’s forestry activities.

The community has formal education systems that offer preschool up to high school. It has a high school with 20 teachers that caters for 514 pupils. The specialised subjects it offers are accountability and technical drawing. The percentage of young people attending school is low, as are literacy rates. Of the young people in the 15 to 17 age group in the community, only 42 per cent attend school while of those in the 15 to 24 age group the figure falls to 21 per cent. In the light of these figures it is no surprise that illiteracy in the over 15 age group stands at 10.8 per cent (Instituto nacional de estadística, geografía e informática 2001).

The participants in this study included 32 pupils, 17 parents, nine high-school teachers and six forest enterprise workers. The educational, social and environmental research methodology advocated by Barraza (2000) was employed. The fundamental principle governing this model is that environmental education is developed from a research process, the findings of which are fed back into the educational proposal (Fig. 1).

The methodology developed draws on a multi-paradigm theoretical framework. An analytical study with the participation of the subjects in the research was carried out using this interpretative research paradigm (Robottom and Hart 1993). Multiple methods were used to understand and interpret the working of the environmental teaching–learning system in schools, in the home and in the forest enterprise as well as the meaning that the participants assign to this education. Survey-type interviews, in-depth interviews and open-ended questionnaires as well as systematic observations from participants were used. Subsequently, some critical research was conducted (Robottom and Hart 1993). A participation/action process was developed based on the actors’ response to the findings of the analysis, with a view to making specific environmental education proposals aimed at young people. This is very important since, to ensure the success of educational...
activities, the recipients’ opinions must be fed back into the design. In this way one can raise the motivation and interest of the participants. This time-consuming process it is still in progress at the time of writing.

The use of a quantitative/qualitative method has the advantage of helping correct the unavoidable bias that creeps into any method, through triangulation, so as to enhance the validity of the data gathered (Cook and Reichard 1997).

Data analysis

The data collected from the survey-type interviews, systematic observations and open-ended questionnaires were evaluated using descriptive statistics in the form of relative frequencies and percentages. The information gleaned from the participative observations and the in-depth interviews was qualitatively analysed using Strauss’ grounded theory (Strauss 1987). An interpretative procedure is inductively applied to the data and subsequent analytical reasoning allows a theory to be framed that focuses on the actors’ perception of the social phenomena at work.

To characterise formal education at the high-school level in the community, systematic observations of the interest shown by pupils and the motivation and commitment of teachers in the classroom were analysed. Analysing the participative observations made it possible to ascertain the teaching methods and techniques used by teachers in the classroom as well as the content taught and to delve into the educational dynamics at work. When interviewing the teachers, the presence of environmental and local contents in the high-school syllabus was analysed as well as the interest elicited from the pupils. The categories formed from their replies were then interrelated in the form of a network diagram.

In their interviews the young people were asked what they had learned in school and in the home about the forest management activities in the community. In addition, the open-ended questionnaire intended for their fathers and mothers yielded information on the transmission of knowledge about community forest resources from parents to young people. The responses to individual questions were placed in different categories. A distinction was made between “comunero” parents (working in the community forest enterprise) and “non-comuneros” (the others).

The interviews of six workers, previously identified as key to the research, yielded information on the involvement of the high-school pupils in community forest activities and on the enterprise as a centre for the environmental education of young people.

Findings

Methods and contents of the environmental education process in schools

All the young people interviewed agreed that school attendance was worthwhile. More than half (55 per cent) stressed that they learned the subject content, while 27 per cent responded that they learned about values and other aspects of community living.

Asked about educational practices, in their interviews several teachers mentioned the lack of teaching guidance in some subjects and an attachment to traditional educational methods “where the teacher remains the protagonist of the process” (High-school teacher M02M) as problems related to the curricula. It was noted that teachers combined techniques of pupil participation and non-participation in the classroom, although they frequently opted for the latter. They did not generally encourage pupils to participate; for instance half of teachers asked less than 12 questions during a lesson while others asked as many as 46. On the other hand, teachers gave due attention to the pupils and answered 91 per cent of the questions asked. Pupil participation in school, measured in terms of the number of questions put to the teacher in class, stood at 35 per cent. It was found that when group dynamics was at work the pupils participated more than when they were working alone, because they had more trouble in answering questions the teacher put to them individually than they did when working in groups with their fellow pupils.

In terms of educational materials it was noted that teachers taught their classes from a textbook and usually did not deviate from the

subject matter. Environmental issues were mainly addressed as part of biology and ecology, although the teachers interviewed considered that these subjects and community-related ones were part of the high-school curriculum. Almost all of them asserted that they addressed matters related to forest resources and San Juan Nuevo traditions and history in the classroom. However, two teachers stated that they hardly ever alluded to environmental topics as these were not on the syllabus (Fig. 2).

Most of them stated that they usually included the community forest enterprise in the subject matter taught, normally to illustrate the administrative and operational management of the community forest resource. However, it was also thought that this topic should be separated from the school curriculum because it was perceived as “an institution that does not impinge directly on village life” (High-school teacher M04H).

As to the specialised subjects offered at high-school level (accountability and technical drawing), some teachers claimed that they fitted in with the general high-school model and that there were jobs requiring them in the community. They proposed including computer technology training, because their experience told them than young people did not intend to stay in the community and that they needed other options so as to work further afield. Nonetheless, others said that the current specialised subjects were inadequate and too limited to equip young people for an academic and occupational future consonant with regional needs. They maintained that they ought to offer training courses in forestry, farming, and cattle rearing, which are the economic activities of the region, and link them with the community enterprise.

Furthermore, they realised that young people take an interest in environmental topics. In the interviews they emphasised that “there is an increasing awareness”, that they ask questions about taking care of the environment and that “the kids really identify closely with the enterprise and natural resources” (High school teacher MOSR). In fact, the young people...
interviewed preferred the natural sciences to the social sciences (52 per cent and 42 per cent, respectively). Nonetheless, some teachers evoked the need to foster interest in this subject because some of the pupils did not exhibit awareness of it. To that end, they proposed the establishment of cooperation mechanisms with the forest enterprise with a view to including more environmental content of local relevance in the high-school syllabus:

it would be more appropriate, more in tune with the surroundings, if they could be offered subjects related to forestry, to the economic activity carried out in the region. . . . It would be a pity if the school were divorced from the existing local production process. I think they should devise local content related to forestry and, well, give the kids a theoretical and practical option so that they better understand their environment and the work done in the forests,

which has attracted international recognition. (High school teacher MO8R)

The home and the community forest enterprise as environmental learning centres

When asked what their main learning source was, most young people pointed to their family (38 per cent), followed by their teachers (33 per cent). Almost all the young people interviewed said that they often received advice, values and knowledge from their parents, particularly their mothers. They mentioned that in conversations with their parents local topics were often discussed and more so in forester (comunero)
families (83 per cent), but no one said that they talked about harvesting forest resources (Table 1).

On the other hand, many parents responded in the questionnaire that they usually talked to their children about the community forest (71 per cent comuneros and 60 per cent others). Moreover, 60 per cent of comuneros asserted that they made their children aware of the importance of forest conservation. Most of the others tell them how the forests had been managed in the past and how they have changed, the deforestation and the benefits that can be derived from the asset, thus inferring its importance. On the other hand, parents who did not talk to their children about the forests (29 per cent comuneros and 40 per cent others) argued that they already know about them, that there was no communication in the home or simply that it had never occurred to them to bring the matter up (Table 2).

When asked if they would like their children to work in the community forest enterprise in the future, 71.4 per cent of the comuneros and 40 per cent of the others responded positively. Most of them maintained that the enterprise paid good wages and that the work would enable their children to value and take care of the forest resource.

Similarly, almost all respondents stated that there were jobs on offer for young people in the enterprise since “as new projects are put in place new job opportunities, particularly for young people, will be created” (Area coordinator for the Forest Enterprise T01RE). However, while some respondents said there was work in forest management for agronomy or forestry engineers or even those with masters degrees or doctorates in science, others thought that there was no more demand in this area and that there was more need for graduates trained to do administrative or other tasks, like chemical engineers to process resins.

As to how well the enterprise transmits forest management knowledge to young people, half of the workers interviewed affirmed that the enterprise offered both financial and professional support to schools in the community, from preschool to high-school level, as “the forest enterprise has always sought to support education” (Area coordinator for the forest enterprise T02LA) so that “the community has always participated in the schools . . . they have always been fully involved in the schools, with high-school students, with secondary pupils, there has been support across the board” (Technical manager for the forest enterprise T05LA).

They said that the enterprise had done most for those preschool and primary school pupils whose teachers had shown more interest in familiarising the children with it. However, only one respondent alluded to educational efforts at high-school level: “the enterprise has cooperated with them in a number of areas, there have been some exchanges between the enterprise and students and vice versa” (Area coordinator for the forest enterprise T06FE).

The educational ventures connecting the community forest enterprise with the high school over recent years were named in the interviews as follows: the participation of young people in reforestation and forest clean-up campaigns; the participation of some enterprise workers in class work at the high-school; and cooperation through meetings between workers and teachers with a view to “jointly addressing teaching planning so as to better transmit experience and knowledge, the importance of training so as to contribute to the population, all the more so now that here in the community we are organised to work and use the resource”.

They explained that cooperation between the community forest enterprise and the high school amounts to occasional involvement in educational activities and assistance with infrastructure. In addition, many feel that young people are not interested in working for the enterprise in the future and this gives rise for concern: “the worry is that there are not many young people interested in staying on, and even worse, in staying on to qualify for any occupation” (Area coordinator for the forest enterprise T04JE).

In this connection, all the workers interviewed agreed that it is in the interest of the communal authorities to consolidate their links with the high school on the educational front and that the enterprise has the technical wherewithal to provide teaching support. This view, taken by institutional officials, tallies with that of the young respondents who were keen to learn about the work done in the forest enterprise. They made a number of proposals towards achieve this, ranging from inviting enterprise workers to give talks at the high school to
designing educational materials with a local environmental content.

**Discussion**

These findings about the educational dynamics at work in the high school show that the traditional education model prevails owing to the techniques used and the lack of flexibility built into the syllabus. Basically, knowledge is transmitted one way, from teacher to pupil. This situation is not unusual in Mexico, as many educators just hand down knowledge, and employ traditional teaching methods and pupils do not play an active role in the learning process (Barraza 2001).

As described by Piaget (1979) traditional schooling provides pupils with large amounts of knowledge and gives them the opportunity to apply it to problems or various exercises, but the pupils do not assimilate it and forget it over time. Conversely, when pupils gain knowledge through their own spontaneous efforts, that is, in a non-directive manner and through self-designed free inquiry, they also find it much easier to remember what they have learnt because they have achieved ownership of the knowledge thus acquired. This teaching–learning model is truly participative and two-way and it is promoted in education for sustainability. However, young people attending the San Juan Nuevo High School tend to adopt a passive attitude in class, especially when they are taught individually, and they do not give their undivided attention to the content being taught by the teacher. This might explain their lack of motivation for study or interest in the subject matter.

In environmental topics, when pupils learn biological and ecological concepts the results are better where there is a greater emphasis on practical work than on the mere transmission of knowledge from textbooks. Nonetheless, it should be remembered that textbooks are the only source of information for many young rural community dwellers in Mexico (Barraza 2001). The inflexibility of the syllabus is such that the content is preset and teachers are confined to teaching the subjects covered in the books. These materials are designed for use in high schools nationwide, which means that they are too general to reflect the local context.

Despite this restriction, most of the San Juan Nuevo teachers said that, in their classrooms they evoked the topic of community forests and also talked about the community forest enterprise. However, the young people knew nothing about many of the details of forest management in their community. Thus extra-curricular contributions from teachers were not enough to consolidate an educational learning process relating to the local environment in school.

Furthermore, the specialised subjects that the schools offer do not focus on the social and ecological context of San Juan Nuevo but, on the contrary, disconnect young people even more from their community and even foster migration. For instance, technical drawing does not lead to jobs in the community so that young people have to leave and seek employment elsewhere, especially in towns. Furthermore, the fact that there is no forest management course on offer is reflected in the apathy and lack of interest young people exhibit in this regard. They receive mixed messages on the community’s main economic activity. Hence, the high-school curriculum is disconnected from real life and, in turn, from the environmental circumstances of San Juan Nuevo’s youth. As educational institutions, schools should be places where young people can reflect on the future of their forest resources, thus making the connection between schools and the community to which they belong.

To establish a syllabus in tune with the interests and needs of the community, cooperation between the various municipal and community institutions and contributions from the various social actors representing the community are needed. For the first time, through a process of reflection, a community participation exercise has been successfully launched that is revisiting the role and participation of young people in the forest activities of their community. The object of the exercise is to formulate educational policies which strengthen community values.

While there is poor transmission of environmental knowledge and values in schools, the situation at home is no better. There social and economic issues prevail in the discourse.
However, it is striking that young people state that most of their learning about the environment takes place in the home. In addition, it is important to note that comunero parents are not playing an effective part in transmitting environmental information to their offspring. This was an unexpected result, as we had imagined that the children of comuneros would be more aware, more interested and have a greater knowledge of forest management. Note should be taken of this worrying finding.

The concerns of parents and, hence, the main topics of conversation in the home do not hinge upon forest conservation and use. Young people are not acquiring an environmental culture linked to their community from their parents; they are not told of the successes and progress made in community forestry which have led to sustainability. This is due, in part, to the absence of a guidance scheme for parents and activities to foster environmental culture in families. Despite this, both young people and parents who are not part of the community enterprise are keen to learn about the work it does.

Devising and implementing an educational programme around the conservation of the local natural environment and fostering positive values and attitudes in young people would be a step towards consolidating a sustainable society in this community. This could take the form of a school syllabus, for, according to Barraza et al. (2003), a critical approach to education for sustainability can be highly relevant if it emphasises awareness raising and actions on the environmental context by the school system per se. However, this kind of knowledge, values and environmental attitudes can also be conveyed in the home as another important centre for teaching and learning. According to Barraza and Ceja-Adame (2003), forming relevant concepts in San Juan Nuevo’s children and young people must be backed up with activities whereby young people interact with their parents and experience the daily practices of resource management, so that the environmental concept becomes part of their everyday lives. According to Titman (1994 in Barraza 2000), the new generations will be able to bring critical thought to bear when discussing environmental issues, will get a better grasp of environmental concepts when they go out into the field and undertake practical tasks and take part in the development of community projects with other members of society.

The findings of this work prompted San Juan Nuevo teachers and community leaders to suggest that the forest enterprise be used as an educational tool in the process of teaching and learning about local environmental contents so as to connect young people with their environment through the work that the enterprise does in the community forests. Drawing on the young people’s ideas, contents were devised for educational sessions. Teachers claimed they were part of biology and ecology, in and out of school hours. However, it was not possible to incorporate them formally in the high-school curriculum. Nor was the possibility of offering them as a special high-school subject considered, probably because to do so would require a lot of time and effort and because the enterprise would not have enough jobs to take on all those who qualify.

Even so, the design and implementation of this educational scheme will help motivate young high-school students to learn about community forest enterprise activities. It will make them more aware of the importance of the work done by many of their parents to conserve the forest and it will get some of them interested in joining the enterprise in the future.

Conclusions

The San Juan Nuevo High-School faces the same difficulties as the other higher educational institutions in the state of Michoacán as regards the treatment of local environmental topics in the curriculum: they are too general, too unsubstantial, deemed unimportant and taught using traditional teaching methods.

The situation is similar in the homes of these high-school students. Parents and children do not usually talk about matters about community forest management. This is as true of the homes of the comuneros as it is of those who do not work for the forest enterprise. The community forest enterprise does not play a role as a centre for environmental education for adults nor for young people because it hardly takes any part in high-school education in the community.
Considering this state of affairs, the importance of our research lies in our having generated a process of reflection in the social environment of San Juan Nuevo high-school students, teachers, parents and comuneros. It has also led to institutional cooperation between the schools and the community. Education for sustainability action has been launched and is being maintained. The process has been one of collective participation throughout. The increased awareness and openness of teachers and forest workers as regards the internal problems of the various institutions was key to the joint planning of an environmental education programme. There is now a collective awareness that needs to extend to education decision-makers for it to make an impact on the curriculum.

Research work into social and environmental education of this kind helps provide guidance for teachers so they can improve their teaching methods and treatment of the curriculum. It helps them respond to questions about their work and better redirect it (Monroe and Kaplan 1996). According to Paré and Lazos (2003), the impact of educational programmes for sustainability deployed in rural areas can be significant when they achieve inter-sectoral participation because they respond to specific needs and circumstances.

Educational package put together with contributions from young people, parents, teachers and comuneros is a first step towards incorporating local environmental issues into high-school syllabuses. To use the community forest enterprise as an educational tool implies interdisciplinary teaching drawing on purely biological and ecological topics (pests, fires, and reforestation), chemical topics (resin processing) and even historical (the history of the community forest enterprise) and economic topics (timber marketing). In addition, the importance of strengthening the identity of the community in terms of its cultural and environmental customs and traditions is built into this approach.

This educational process is intended to be retroactive and involve various social sectors. At the non-formal level, teachers will introduce young people to the forest management activities that are carried out in their community. The enterprise workers, some of whom are the parents of these young people, will play the part of communicators. The young people will discuss this experience with their parents, who will be able to enhance their knowledge. Back in school, they will explain to their classmates what they learnt at home. In this philosophy, as stated by Paré and Lazos (2003), education is not seen as a mere process of transmitting knowledge but, on the contrary, becomes a political instrument for transforming the social and political awareness of the sectors concerned.

The objective now is to implement this package in the community’s formal education system. This is a difficult task since the aims and definitions of Mexican curricula and syllabuses are disconnected from regional labour situations. Nonetheless, the Decade of Education for Sustainable Development provides a splendid opportunity to change the situation, as it envisages mechanisms that will help the education authorities support schools in implementing the organisation, contents and practices of the scheme (Food and Agriculture Organization 2005). Moreover, young people, teachers and the communal authorities are all keen and interested in bringing about this change in the curriculum. Once the state authorities that oversee the high school and the forest enterprise enter into a clear commitment to the environment, educational programmes for sustainability can be formulated and implemented in the formal sector. They will impact on the education system through a participative approach from conception through to implementation. Thus the rigid traditional education mould will be broken and passivity and restricted educational content superseded. At the same time young people will be encouraged to adopt values and attitudes by which to recognise the importance of carrying on the environmental conservation work and the sustainable forest management pursued by their community.
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