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Clarion University of Pennsylvania, Clarion, Pennsylvania

ADOPTION AND DIFFUSION OF AGROFORESTRY AND NATURAL RESOUCE MANAGEMENT TECHNOLOGIES THROUGH SCHOOL-COMMUNITY LINKS

CT Gadzirayi, Emutwandwa, and R. Muchapondwa
Bindura University of Science Education

Abstract

This study investigated whether integrating agroforestry and sustainable natural resource management (NRM) strategies in schools leads to the adoption and diffusion of agroforestry and NRM innovations to the communities.

Case studies of two primary schools were done. The schools were selected on the basis of whether they implemented agroforestry and sustainable NRM technologies. The selected schools had a total population of 140 pupils from grades 6 and 7. A sample of 20 boys and 20 girls, 30 parents, 5 school leavers, 8 teachers and 2 headmasters participated in the survey. Questionnaires for parents, school leavers, pupils, teachers and headmasters were designed and used to collect primary data while secondary data was collected from the ICRAF, school documents and from literature.

It was established that integrating agroforestry and NRM in schools curriculum leads to their diffusion and adoption since pupils share knowledge acquired from school with their parents. It is recommended to integrate environmental management innovations in schools so that they can be diffused and adopted by the communities.

Background

Most environmental education programs in Africa focus on children as bridges of change within communities (GreenCom, 2000). In Zimbabwe, most environmental focused programs such as permaculture, natural resource management and agro-forestry are found in primary and secondary curriculum

The World Agro-forestry Center (ICRAF) is an international and intergovernmental organization established in 1978 to promote agro-forestry research and sustainable management of natural resources in developing countries. The ICRAF programme in Zimbabwe was commissioned in 1991 after realizing that most smallholder farmers in Zimbabwe were prone to increased poverty, food insecurity and environmental degradation the organization developed appropriate agro-forestry technologies that addressed widespread problems of poor soil fertility and shortage of good quality fodder.

The organization also carried out researches on the domestication and development of indigenous fruit trees of the miombo woodlands for improved household nutrition and incomes. It was realized that there was need to develop a programme on dissemination of agroforestry information. The organization's goals were achieved through distribution of extension materials, establishment of demonstration plots, training of farmers and farmer trainers and other stakeholders in agroforestry as well as building partnerships in the dissemination and scaling up of agroforestry technologies. To promote technology transfer it also made strategic partnerships with various government ministries, projects, parastatals, non-governmental organizations, community based organizations and schools.

The organization has been using schools as vehicles for the dissemination and scaling up of agro-forestry related programs, which promote technology transfer to the community. Through this approach pupils become an important critical mass for diffusing technologies to communities in which they reside. Thus the need to investigate whether integrating agroforestry and sustainable management of natural resources in

schools can lead to better awareness of the environment among community members becomes inevitable.

Problem statement

The World Agroforestry Centre (ICRAF) started working with pilot schools in Zimbabwe in the year 2002 as a way of diffusing sustainable Natural Resources Management (NRM) technologies. The assumptions made were that pupils tell their parents what they learn and parents also learn through demonstrations held in those schools. However, the organization does not know whether the agroforestry programme in Zimbabwe is reaching the community and whether the communities are adopting through the school. Therefore there is need to investigate on the role of school-community links on environmental improvement.

Objectives

Main objective

To investigate whether integrating agroforestry and sustainable natural resource management (NRM) strategies in schools leads to the adoption and diffusion of agroforestry innovations to the communities.

Specific objectives

a. To assess whether pupils share agroforestry knowledge and sustainable NRM technologies with their parents.
b. To determine the role played by school in the adoption and diffusion of agroforestry and NRM innovations by the community

c. To determine the rate of agroforestry and NRM skills application by the school leavers.

d. To determine the rate of adoption of agroforestry and NRM techniques by the community members.

Methodology

Schools selected for the case study

Two primary schools were selected on the basis of the following criteria:

- Schools should have implemented agroforestry and sustainable NRM technologies:

Mupumbu Primary School

Mupumbu primary school is 105 kilometres from Harare and it is found in Mashonaland West Province. It is located in the agro-ecological region 2. The school implemented agroforestry from the year 2002. The school works with organizations such as the Forestry Commission, which is a partner organization of ICRAF. The school is involved in tree growing initiatives where it came first and second in the Tree Growing and Tree Care (TGTC) competitions at provincial and national levels, respectively.

Kadyamadare primary school

Kadyamadare school is located 57 kilometres east of Harare. It is found in Mashonaland East Province, which is in the agro-ecological region 2. The school also implemented agroforestry whereby different tree species are integrated with crops in the school garden.

Sampling process

The two schools had a total population of 140 pupils from grades 6 and 7. A sample of 20 boys, 20 girls, 30 parents, 5 school leavers, 8 teachers and 2 headmasters were interviewed.

From the list of teachers a simple random sampling method was used to select the teachers to be interviewed. The teachers in charge of the two senior grades, that is, grade 6 and 7 provided us with the list of the pupils with two lists for boys and girls. The names were numbered and they were selected randomly using numbers generated on the calculator. Boys and girls to be interviewed had equal chances of being selected. Pupils and teachers who were interviewed provided us with different names of community members who are successful in farming and also names of school leavers. Local extension officers provided names of school leavers and also successful farmers in the two school environs.

Data collection

Primary data

Questionnaires for parents, farmers, school leavers, pupils, teachers and headmasters were designed and used to collect primary data.

Secondary data

Secondary data sources from the ICRAF, schools and from Literature were used as they provided the basis for sampling frames and cross- checking information.

Results

Assessment of Whether Pupils Share Agro forestry and NRM Knowledge with their Parents

Fig 4.1 shows that 52% of the pupils share information on agroforestry and NRM knowledge, which they learn from school with their parents. On the other hand 48% of the pupils do not share agroforestry and NRM information with their parents.

From the graph in figure 4.2, 88% of the pupils said that their parents had implemented agroforestry innovations, which they told them after they were taught in school whilst 12% of the pupils had their parents not practicing the technologies.

Forty percent of the parents said that they got the information on agroforestry and NRM from their children whilst 15% and 10% from teachers and headmasters respectively (Fig 4.3). Ten percent got information on agroforestry from AREX personnel and other farmers already practicing agroforestry.

Determination of the role played by teachers in the adoption and diffusion of AF and NRM innovations

Most teachers, 46% indicated that it is their duty to reach out to the community through teaching children who will later share information or knowledge learnt with their parents/guardians (Fig 4.4). Thirty percent achieve that through interacting with community members and 20% achieve that through holding meetings with parents or members of the community.

The level of AF and NRM skills application by school leavers

Forty percent of the school leavers are applying soil fertility agroforestry skills, which they acquired from school whilst 30% are applying skills, which were acquired from sources other than the school (Fig 4.5). Thirty percent are not practicing and this

shows that more adopters acquired the skills from school. The same applies for fodder and domestication of indigenous fruit trees with the higher percentages of adopters who acquired the skills from the school.

The level of adoption of AF innovations by community members

Most community members who have adopted agroforestry and NRM innovations acquired the knowledge from school as indicated by 48%, 30% and 55% for soil fertility, fodder and domestication of indigenous fruit trees respectively (Fig 4.6). Those who have adopted through non-school sources are 20%, 15% and 25% for soil fertility, fodder and domestication of indigenous fruit trees respectively.

Discussion

Sharing AF and NRM knowledge between pupils and parents

From the results obtained the most pupils share knowledge on agroforestry and NRM with their parents and this may be because agroforestry and NRM are taught as practical topics where the children are taken out to the garden or to the field and discover on their own. The experiential knowledge does not come out easily meaning to say they cannot easily forget. Vandenbosch *et al* (2002), found the same results whereby he found that pupils retain 80% of what they do as opposed to 10- 20% of what they hear or read. In general most pupils have shown to share knowledge on what they would have learnt in school. Eighty-nine percent of the pupils who shared agroforestry and NRM knowledge with their parents responded that their parents have practiced what they had been told by their children. This also shows that pupils can also directly influence their parents. These

results are the same as those, which were found by Wheeler (1997). Wheeler found that parents are more willing to consider adopting new practices once they see and learn from their children about the their benefits.

Parents also stated that they get different information on what happens in school from their children since 70% of the parents said that they benefit from having their children in school and they benefit through the knowledge that their children get from school. The knowledge and expertise that children get from school can become important resources for families who engage in activities done in school (Wheeler, 1997). The results also show that of all the parents who know about agroforestry and NRM, 40% of them got the knowledge from their children. This also shows that pupils are contributing significantly in the diffusion of agroforestry and NRM innovations.

Teachers contribution in diffusion and adoption of AF innovations

Teachers are practicing agroforestry in their backyard gardens and on small pieces of land allocate to them by local leaders A Chi squared test done to find if there is any relationship between practicing and sharing the information showed that there is a significant relationship between practicing and sharing information on NRM and agroforestry with the local community. The results have also shown that the more frequent the teachers meet parents the higher the chances that they will discuss about agroforestry and NRM technologies, and that match with what was emphasized by Temu (1995), that teachers' personal experiences and relationships with the community are of major significance.

School leavers' application of school acquired AF and NRM skills

Most school leavers apply the skills that they would have acquired from school when they leave school. Forty percent of the school leavers apply soil fertility, 50% fodder and 30% domestication of indigenous fruit tree acquired from school because of the practical nature in which the AF and NRM technologies are imparted to the pupils (Hanyona 2003).

The T test done on the level of application shows that 50% application rate is significant. This shows that there is a positive relationship between schools and communities.

Adoption of AF and NRM innovations by the community members

The percentages for the adoption differ with the innovation in question where domestication of indigenous fruit trees has a higher percentage followed by soil fertility and the fodder. This could be because the local fruit trees are more adaptable to local conditions and farmers are acquainted with their growth requirements. The T- test shows that the 50% adoption rate is significant.

Conclusions

From the results, it can be concluded that integrating agroforestry and NRM in schools curriculum leads to their diffusion and adoption since pupils share knowledge acquired from school with their parents. Parents also indicated that they get information on agroforestry and NRM from their children. Teachers also play a crucial role in the adoption and diffusion of agroforestry and NRM innovations since they agreed that it is

their duty to reach out to the community. Parents also indicated that they get information on agroforestry from teachers and headmaster.

From the results it can also be concluded that school leavers apply skills, which they acquire from school.

Recommendations

It is recommended to integrate environmental management innovations in schools so that they can be diffused to the community and adopted by the communities. This can be achieved through a number of activities such as.

- Fostering of strong relationships between schools and organizations concerned with environmental issues through collaborative partnerships.
- Provision of support materials on agroforestry and NRM that can be used in addition to officially available teaching materials.
- The need to set up agroforestry and NRM sites jointly managed by the school and the community.
- Set up agroforestry and NRM youth clubs in the community.

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Fig 4.1 Transfer of Agroforestry and NRM from Pupils to Parents

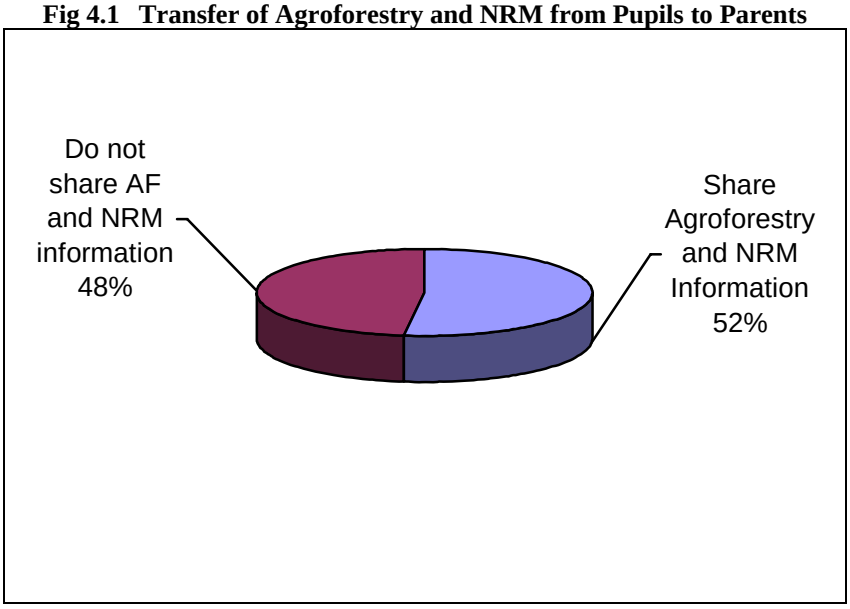

Fig 4.2 Pupils with parents who have implemented AF innovations

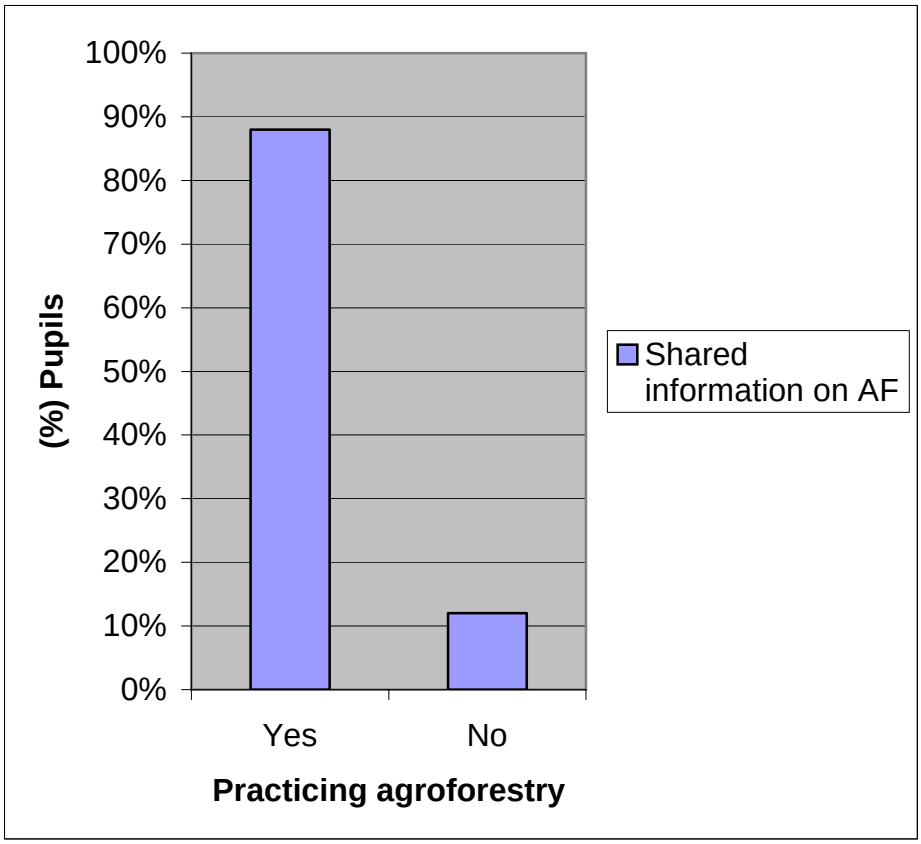

Fig 4.3 Different sources of AF and NRM information for parents

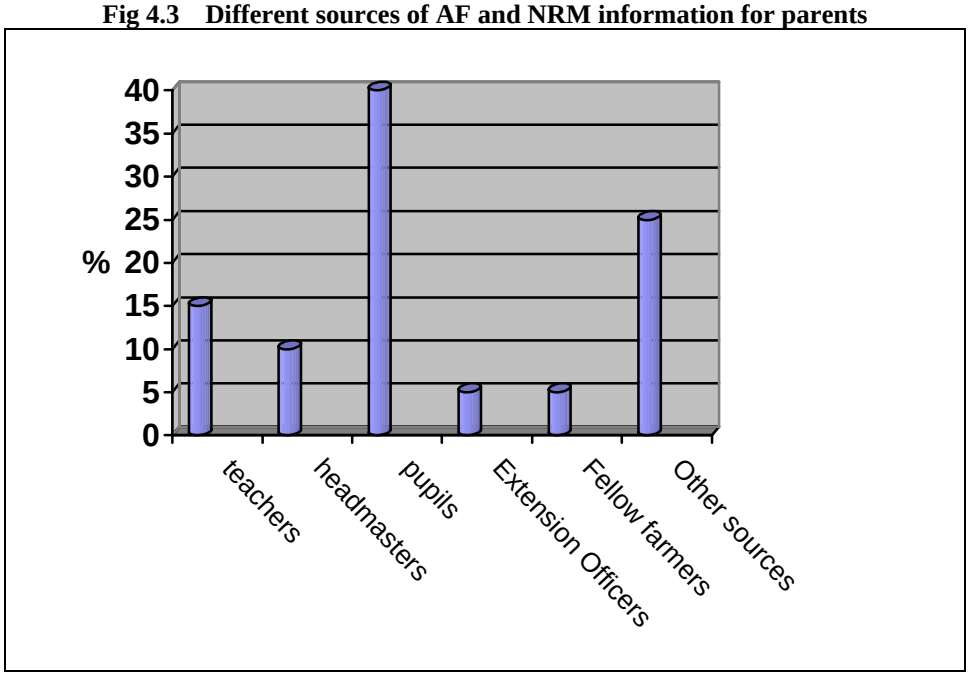

Fig 4.4 Teachers' duty to reach out to the community

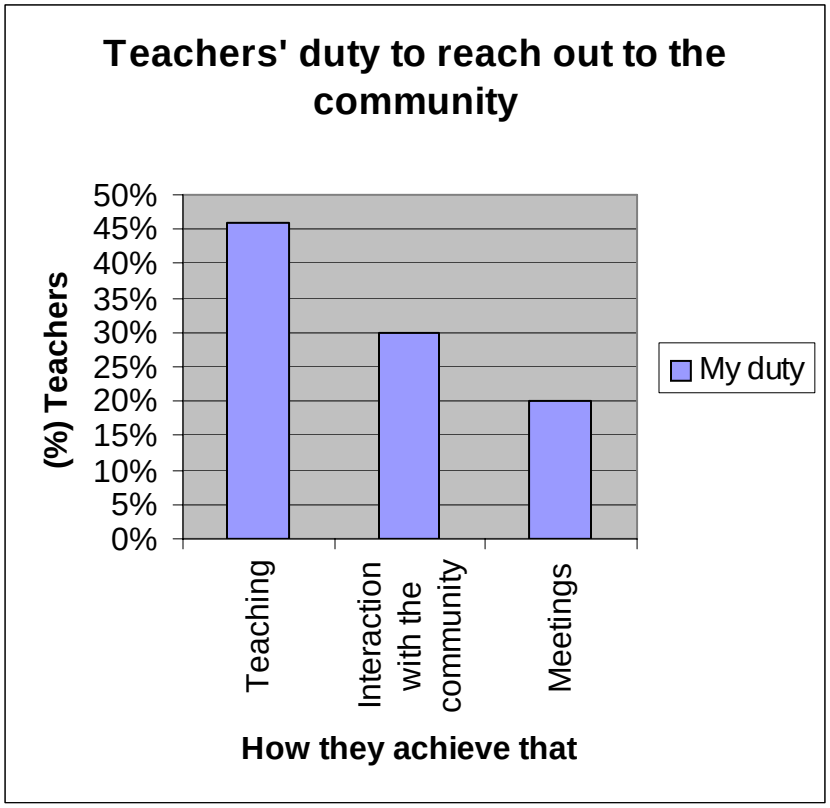

Fig 4.5 Level of application of different AF and NRM skills by the school leavers

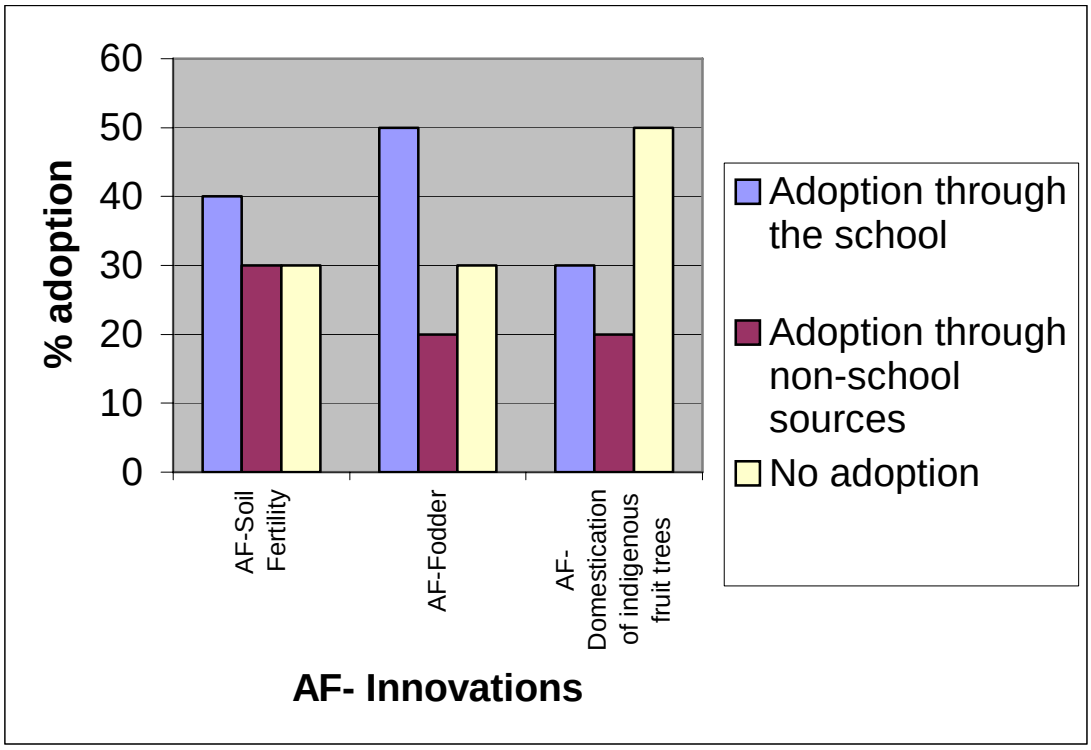

Fig 4.6 Adoption of different AF and NRM innovations by the community members