



The ‘Jorani Project’: Incorporating Principles of Sustainable Rural Development into the Education System of Cambodia

ROBERT J. MARTIN

*University of New England, Armidale, NSW, Australia
Email: bob.martin@une.edu.au*

WENDY MATTHEWS

Wellington, Ontario, Canada

STEPHAN D. BOGNAR, NARAP OURM AND KYNAL KEO

Maddox Jolie Pitt Foundation, Battambang, Cambodia

Received 11 January 2010

Accepted 5 March 2010

Abstract An illustrated children’s book “Jorani and the Green Vegetable Bugs” has been published in Khmer language to teach children and teachers in rural areas about integrated pest management (IPM) in upland crops and the positive impacts on the environment and human health in Cambodia. The project involves introducing the Jorani Project to school directors and teachers; development of a teacher guide; implementation in schools; and celebration and public launch. Further books in the series are planned to teach the benefits of other sustainable land management practices. The project targets five primary schools in northwestern Cambodia in the district of Samlout in Battambang Province where the Maddox Jolie-Pitt Foundation (MJP), in collaboration with the Ministry of Education, Youth and Sport (MoEYS) is working to strengthen primary education for all school-aged boys and girls. The potential to achieve the stated agricultural extension and primary education objectives will be evaluated after completion of the pilot project. Social network analysis will be used to test the effectiveness of the proposed learning environment model. Depending on the findings, a Life Skills framework for rural primary schools will be presented to the MoEYS for endorsement and roll-out to primary schools in other Districts and Provinces in Cambodia.

Keywords rural development, primary education, life skills, crop diversification, food security, nutrition

BACKGROUND

Since 2003, the Australian Centre for International Agricultural Research (ACIAR) has funded two projects in upland areas of Cambodia to help reduce poverty and contribute to food security through the development of sustainable farming systems for upland crops such as maize, soybean, peanut, mungbean and sesame. The original ACIAR project involved discussion with farmers, validation of local knowledge, documentation of case studies and agronomic field experiments. The project was conducted in collaboration with the Cambodian Agricultural Research & Development Institute (CARDI) and with support from the Cambodian Department of Agricultural Extension in the Ministry of Agriculture, Fisheries and Forestry (MAFF).

The approach of the ACIAR project (Farquharson et al., 2010) has been to first investigate and demonstrate new technologies or improved practices in a farming systems context through a network of on-farm trials and demonstrations. These are combined with village workshops to identify the social and economic constraints to adoption of new technologies and changes in management practices. “Crop Profit Groups” of local farmers have been formed to assess the economic costs and benefits of new technologies and changed management practices. The project

provides outside expertise in a co-learning environment with local farmers, government advisers and NGOs. Education and capacity-building for Cambodian collaborators has been an important part of the work.

Various extension publications have also been produced targeting agricultural extension professionals and tertiary agricultural educational institutions. These publications have a high potential for impact on the profitability of small-holder farms, leading to poverty reduction, and food security. Extension materials directed at farmers, however, are somewhat ineffective because of the low literacy levels in the rural areas of Cambodia. It was thought that production of educational material for rural primary school children and teachers could improve the flow of new agricultural information to farm families.

The idea for the Jorani Project arose when it became evident that government agencies did not have the physical infrastructure or human resources to implement extension messages such as environmentally friendly agriculture to the local communities in a sustainable way. MJP, working with teachers and school directors in the region since 2006 to reach the UN Millennium Development Goals (MDG 2) in primary education, identified the primary school classroom as a potential vehicle to not only deliver the messages, but also create child friendly life skill ‘farming’ activities for both the teacher and student.

To move the project forward, ACIAR agreed to publish an illustrated children’s book created by a team of authors, including local Samlout teachers to raise awareness on sustainable green farming practices. The book, called “Jorani and the Green Vegetable Bugs” is to complement the second ACIAR project “Enhancing production and marketing of maize and soybean in north-western Cambodia” (ASEM/2006/130) which commenced in 2008 and runs to 2011. The aim of the ACIAR project is to improve the functioning of the production and marketing system for maize and soybean in north-western Cambodia as a key to increasing cash income, sustainable growth and poverty reduction for small-holder farmers. The project facilitates the sharing of knowledge and information at all stages of the value chain from farmer to end-user.

The Jorani Project will teach children in five target schools in Samlout about integrated pest management (IPM) in crops and the positive impact on human health and the environment. If the pilot is successful, further books in the series are planned to teach the environmental benefits of reduced cultivation and burning in crop production, and also the value of wildlife conservation and healthy eco-systems.

Jorani’s success will also be linked to the Maddox Jolie-Pitt Foundation’s environmental youth program. In 2008, the Ministry of Education, Youth and Sport (MoEYS) gave approval to MJP to create a youth program called ‘Eco-Rangers’, a club designed to help Samlout’s children and their families explore and learn about their environment. The Jorani Project will be included in the ‘Eco-Ranger Club’ initiative. It will establish links between agriculture and other community activities such as those directed to improving human health and nutrition.

Teacher training in Cambodia may include a variety of agricultural topics such as chemical and organic fertilizers, insect pests, IPM, rice production, water usage, land preparation and chicken-raising. Most school directors, however, do not develop or implement the given Government agriculture curriculum, instead pushing it into the voluntary Life Skills program. Unfortunately, most teachers use the time allocated to Life Skills for clean-up day, presumably because of lack of teacher training and life skills resource materials for teachers.

The Jorani Project could easily be integrated into the Life Skills program if teachers are provided with resources, appropriate training and technical support from agricultural experts. This strategy has been achieved in other countries. For example, Hoppers (2007) noted that the need for life skills development as a core set of competencies is accepted in countries such as Brazil, Namibia, Burkina Faso, Uganda and Thailand. In Cambodia, however, little appears to have been done to include these types of activities in school curricula. Part of the problem appears to be that technical expertise for life skill subjects such as agriculture is provided by different government ministries and teachers might find it difficult to access appropriate information. This is the case in Cambodia where tertiary agricultural education is administered through the Ministry of Agriculture, Forestry and Fisheries. It is important to note that MoEYS officials advised MJP that

previous attempts to introduce life skills programs had not been sustainable in Cambodia and that any project will need to have clear goals and be coordinated through MoEYS.

The Jorani Project is a case study to see if agricultural content can be incorporated into the life skills program. Benefits to primary education at student, teacher and system level will need to be demonstrated as well as improved uptake of agricultural technologies. Taylor and Mulhall (2001) carried out research on linking learning environments through agricultural experience to enhance the learning process in rural primary schools in Tanzania, Sri Lanka, India and Ethiopia. They examined the way in which teachers in rural primary schools link the formal school curriculum with the life experience of their pupils, particularly in relation to agriculture. They found that teaching aids and materials, particularly those which relate to the local context, were often in short supply or lacking altogether. Where they were available, teachers' guides and pupils' textbooks often used urban-based examples which were not familiar to children in rural areas.

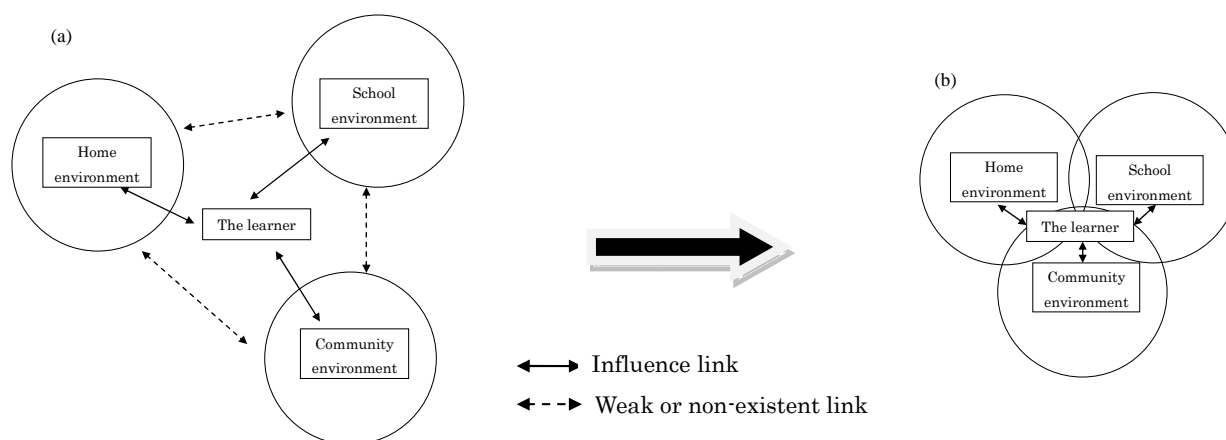


Fig. 1 Strengthening the learning environment linkages between school, home and community (Taylor and Mulhall, 2001)

Taylor and Mulhall identified three key learning environments for school-going children: the school, the home and the wider community. They observed that these three learning environments are often disconnected and the experiences gained in each are seldom drawn together and integrated in the learning process (Fig. 1a). According to Taylor & Mulhall, weak linkages between the three learning environments infers that the experiences gained by pupils in school are often perceived to be divorced from life outside school, not only by pupils but also by parents and teachers. Learning could become more effective if these linkages were strengthened and if the interfaces between learning environments were maximised (Fig. 1b). Developing life skills programs that are relevant to rural communities may achieve the outcomes suggested by Taylor & Mulhall.

Other studies in developing countries confirm these observations. Khupe et al. (2009) reported that education for most rural children has only a small, if any, relationship with students' lives outside the classroom. More than 30 years ago, Lindsey (1975) observed that school curricula were leaving rural children with a low capacity to function within their societies because they lacked the requisite skills. This appears to be true today. The challenge for rural education is not only that of achieving literacy, but also guaranteeing employment and self-employment of the 'economically active' population (Bouyer et al., 2005). Rural people make their own informal evaluations of local education, where they check school leavers' capacity to contribute towards community improvement. Formal education in many developing nations does not equip students with skills that could be useful in developing their communities. Acker & Gasperini (2003) emphasized that relevance of educational programs in rural areas is an important area for improvement especially with regard to relevance to local needs.

It should be noted that in some cases locally relevant life skills programs have met with hostility from parents who do not see the point of having their children acquire practical knowledge which they felt they could provide themselves (Atchoarena and Gasperini, 2003). If parents send their children to school so that they can escape from rural life and find a job in the city they might not be happy with locally-relevant life skills programs (Bergmann, 1985). Therefore the Jorani Project will need to obtain feedback on attitudes and beliefs of all participants and stakeholders in the Samlout case study.

THE “JORANI PROJECT”

The purpose of the Jorani Project was to conduct a pilot study in the district of Samlout to:

1. Determine if inclusion of agricultural subjects in the primary school life skills program leads to improved uptake of new technologies and more sustainable land management practices
2. Determine if life skills activities in rural primary that are relevant to rural communities can strengthen the linkages between the school, the home and the wider community.

The MJP education project team examined the curriculum for primary school grades 4, 5 and 6 to determine where the Jorani resource best fitted into the current curriculum. The education team then consulted with the agriculture team to produce activities and materials to enhance teachers' understanding of important content presented in the Jorani book. The education team worked with the Battambang Provincial Director of Primary Schools to develop a template for the Teacher Guide. The Director was also invited to be the advisor and possibly co-facilitator for teacher professional development. The project involved the Samlout district villages of Bueng Run, Kampong Touk, Kantout, Ou Chrab, Samlout and Sre Reach. The schools involved were: Kampong Touk, Ou Chrab, Sre Andoung II, Sre Andoung lower secondary and Sre Reach. The total number of children involved in the project was 638 (Table 1).

In phase 1 of the project a group of 20 teachers and school directors from Samlout district attended an introductory workshop on IPM run by the ACIAR project at Samlout in October 2009. The workshop was also attended by the Battambang Provincial Director of Primary Education. The workshop was in the same format as used for agricultural advisers and key farmers and consisted of a series of presentations, practical exercises and field activities. Resource materials included a workshop manual, an insect identification guide, notebooks and data recording sheets. The workshop covered: an overview of IPM; crop growth and development; insect management options; insect monitoring techniques; calculating economic thresholds; safe and proper use of pesticides; personal protective equipment (PPE); and types of insecticides available in local markets. The illustrated insect field guide provided a brief description of insect pests and the damage they cause as well as information on a range of beneficial insects and spiders that can be found in upland crops in north-western Cambodia.

Table 1 Samlout District primary schools and numbers of children involved in the Jorani Project

	Grade 4		Grade 5		Grade 6		Sub Total		Total
	M	F	M	F	M	F	M	F	
Ampob Leu	10	17	0	0	0	0	10	17	27
Kampong Touk	9	4	15	2	0	0	24	6	30
Ou Chrab	33	31	36	30	37	26	106	87	193
Sre Andoung II	39	47	43	44	38	35	120	126	246
Sre Reach	36	27	20	21	15	23	71	71	142
Total	127	126	114	97	90	84	331	307	638

It is important to note that the education team consulted with MJP's agriculture team to produce activities and materials to enhance teachers' understanding of important content presented in the Jorani book. The education team also worked with the Battambang Provincial Director of Primary Schools to develop a template for the Teacher Guide. The Provincial Director was invited to be the advisor and possibly co-facilitator for teacher professional development.

Phase 2 of the project involved a three day workshop for all grade 4-6 teachers and school directors from the pilot schools as well as senior staff from the provincial and district offices of the MoEYS. The goal of this workshop, facilitated by the MJP education team and an expert teacher from Canada, was to demonstrate how a resource such as the Jorani book that is based on life skills important to students' families and community can be effectively used to develop literacy and scientific skills linked to curriculum expectations. During the workshop teachers learned and practiced 15 different methodologies such as jigsaw, book making, song creation, puppet plays, nature colour hunts, interviews and sports games. They created a journal record of each methodology and more importantly identified and discussed the skills students would be developing as they participated in these stimulating child-friendly activities. Discussions included how the same methodologies could be applied in different subjects within the curriculum. On the final afternoon teachers and staff developed plans for the next phase – development, timing and implementation of the IPM Life Skills program they would present using the Jorani book and the new methodologies they learned.

Phase 3 was designed to ensure teachers are well prepared and confident to provide the IPM Life Skills program. The design included one full-day training and two half-day workshops for teachers prior to their implementation of the IPM Life Skills program in their classrooms.

At the end of phases one and two teachers still had questions about IPM. Unlike classrooms in the developed world, students do not have access to the internet and teachers recognize they need to be the experts. The full-day training will be offered by an MAFF expert to provide sufficient content in the Khmer language for them to feel comfortable as IPM experts in the classroom. Resource materials will include an illustrated insect field identification guide and an IPM workshop manual.

The teachers will then participate in two half day workshops. The objectives of the first workshop are to: decide what content about plants, bugs, and pesticides should be covered in each school grade; develop their IPM Life Skills lesson plans incorporating some of the 15 methodologies they learned at the previous workshop. During the second half-day workshop, teachers will complete lesson plans for IPM Life Skills and produce teaching materials for the program. Teaching materials will be prepared and include school kits with specimens of insects occurring in local crops and as shown in the Jorani book, insect field guide book and the IPM workshop manual.

The project is to be implemented in the Samlout schools during January and February 2010. The teachers were advised to modify the program as necessary to adapt to the needs of the individual class. Suggestions for school class activities included:

- Working in groups to develop dramas based on the story and making costumes or masks to look like insect characters from the book (there should be a prior class discussion to identify the important agricultural information that should be built in to the plays);
- Simple hand puppets of the good and bad bugs could be made to create puppet shows to act out the roles of the good and bad bugs;
- Making up lyrics about the story and sing these to the tune of a popular song;
- Preparation of short speeches on integrated pest management (IPM) based on what was learned from the book;
- Creation of individual insect books or working collaboratively to make a large class book that could be placed in the school library.

Local farmers, agricultural experts and conservation officers will be invited to the school to talk to the students about their experience using IPM on their farms and the positive impact on the environment. Students will develop a series of interview questions ahead of time and one or two students will conduct the interview followed by a question and answer period where all students

ask questions. Follow-up activities planned for the early wet season (May-June) include insect collections and school gardens.

The program will culminate in an open door Celebration Day including games, songs, puppet plays, displays of work books and artwork (Phase 4). During the event, each child will be presented with their own personal copy of “Jorani and the Green Vegetable Bugs” to take home. A total of 700 Khmer language Jorani books will be distributed.

CONCLUSION

After completion of the pilot project, the ACIAR project team plans to carry out an evaluation to determine the potential to achieve both agricultural extension and primary education objectives. It is expected that the project messages will spread through expanding circles of sharing (like ripples) among small groups; the whole class; between classes; between schools; at home with parents; and with the wider community. Social network analysis as described by Borgatti et al. (2009) will be used to test the learning environment model proposed by Taylor and Mulhall. Depending on the findings, a proposed Life Skills program for rural primary schools will be presented to the MoEYS for endorsement and roll-out to primary schools in other Districts and Provinces in Cambodia.

ACKNOWLEDGEMENTS

We gratefully acknowledge the support of the Royal Government of Cambodia, the Maddox Jolie Pitt Foundation and the Australian Centre for International Agricultural Research for making this project possible.

REFERENCES

- Acker, D. and Gasperini, L. (2003) Launching a new flagship on education for rural people, An initiative agricultural and extension educators can get behind. *Journal of International Agricultural and Extension Education*, 10, 81-85. (<http://www.fao.org/sd/erp/ackerfall2003.pdf>).
- Atchoarena, D. and Gasperini, L. (2003) Education for rural development, Towards new policy responses. FAO and UNESCO/IIEP (http://www.fao.org/sd/erp/ERPglobalstudy_en.htm).
- Bergmann, H. (1985) Agriculture as a subject in primary school. *International Review of Education*, 31, 155-174.
- Borgatti, S.P., Mehra, A., Brass, D.J. and Labianca, G. (2009) Network analysis in the social sciences. *Science*, 323, 892-895.
- Bouyer, B.; Debouvry, P. and Maragnani, A. (2005) Skills for rural people, A renewed challenge. *Debates in Skills Development*, Paper 10, Working Group for International Cooperation in Skills Development, Italy.
- Farquharson, R.J., Martin, R.J., Chan, P., Touch, V. and Keo, K. (2010) Crop profit groups and farmer participation in research, Some experiences from Cambodian upland regions. *International Journal of Environmental and Rural Development*, 1(1), 194-203.
- Gasperini, L. (2000) From agricultural education to education for rural development and food security, All for education and food for all. Food and Agriculture Organization of the United Nations (<http://www.fao.org/sd/exdirect/exre0028.htm>).
- Hoppers, W. (2007) Meeting the learning needs of all young people and adults, An exploration of successful policies and strategies in non-formal education. Background paper prepared for the Education for All Global Monitoring Report, 2008.
- Khupe, C., Keane, M. and Cameron, A. (2009) Education, relevance and rural development. *Innovation for Equity in Rural Education*, Symposium Proceedings, Australia.
- Lindsey, J.K. (1975) Rural education and underdevelopment, Aspects of the politics of education. Paper for the UNESCO IIEP Seminar.
- Martin, B. and White, D. (2009) Jorani and the green vegetable bugs. *ACIAR Monograph*, 137, 1-48. (<http://www.aciar.gov.au/publication/MN137>).
- Taylor, P. and Mulhall, A. (2001) Linking learning environments through agricultural experience, Enhancing the learning process in rural primary schools. *International Journal of Educational Development*, 21,

135–148.

Van Crowder, L., Lindley, W.I., Bruening, T.H. and Doron, N. (1998) Agricultural education for sustainable rural development, Challenges for developing countries in the 21st century. *Journal of Agricultural Education and Extension*, 5, 71-84.