Spreading agricultural good practices: multidimensional benefits observed in Kampong Thom, Cambodia

Félicien Meunier[1], Camille Heylen, Amaury Peeters[2], Sreykhouch Ek[3], Malyne Neang[3], Saray Hean[4], Sinal Peanh[4]

Key words: Cambodia, Agriculture, Sustainability, smallholder farmers

Abstract

Agriculture is the traditional mainstay of the Cambodian economy, accounting for almost 90% of GDP and employing around 85% of the work force. Agricultural practices remain mostly traditional even if intensification appears chaotically in some regions. In the central province of Kampong Thom, a non-governmental organization (Minority Organization for Development of Economy) spreads organic agricultural good practices to local vulnerable farmers encouraging them to develop environmentally friendly crop production systems and to diversify their incomes. A survey was conducted in the region to assess the benefits of such an approach five years after the beginning of the project. One hundred farmers equally distributed in two groups (target and control) were interviewed. This survey revealed significant differences between the two groups in terms of production systems, agricultural knowledge and risk mitigation activities.

Introduction

In Cambodia, about 85% of the households are involved in agricultural activities with an average agricultural land holding of 1.6 ha per family (NIS 2014). Most of these smallholder farmers are trying to meet first their consumption needs and are cultivating rice almost exclusively using traditional farming practices. This situation leads to low average yields and makes farmers extremely vulnerable economically. Their production is also highly dependent on the annual weather conditions and many of them already feel the consequences of climate change.

In this context, several local, regional, national or international stakeholders help smallholder farmers to increase their agricultural knowledge and to improve their farming practices. Minority Organization for Development of Economy (MODE) is working with vulnerable farmers in 8 communes of the central province of Kampong Thom providing seven day training on sustainable agriculture, field demonstrations and agricultural kits to diversify their production and to increase their incomes. The trainings and the kits focus on seven different topics related to food diversification and organic farming system: goods practices in chicken raising, system of rice sustainable intensification, method for developing an aquaculture production, methodology for composting and cultivating vegetables in the house garden, lessons for edible fruit tree planting and food processing. Trainings are then followed by regular follow-up by MODE field facilitation team during several months. Model farmers are also selected during the course of the project and help the diffusion of good organic practices.

Five years after the launch of the sustainable agriculture project (started in 2011) and after almost a thousand beneficiaries, it was time for the organization to assess the benefits of learning and applying sustainable agricultural practices for smallholder farmers in this Cambodian province.

[1] Earth and Life Institue, Université catholique de Louvain, Belgium, felicien.meunier@uclouvain.be

[2] Louvain Coopération au Développement, Louvain-la-Neuve, Belgium

[3] Ecoland Research Center, Royal University of Agriculture, Phnom Penh, Cambodia

[4] Minority Organisation for Development of Economy, Kampong Thom, Cambodia

Material and methods

The Sustainability Assessment of Food and Agriculture systems (SAFA) method developed by the Food and Agriculture Organization (FAO 2013) was used as the general framework defining sustainability in agriculture. 80 out of the 105 core indicators listed in this methodology were selected according to their relevance to the local context of the familial small-scale agriculture in Cambodia and on the basis of discussion with local partners. The selected themes and subthemes were distributed in the four dimensions of the agricultural sustainability, namely environmental integrity, social well-being, good governance and economic resilience.

From this indicators-based sustainability assessment tool, a questionnaire was developed to reveal the current farming practices of the interviewees, their economic status, the perception of the risks threatening their enterprise (as listed by local actors and the SAFA method) and their perspectives in a changing world. These answers aim at answering the following questions: what are the benefits of sustainable agricultural practices for small landholder farmers in Cambodia and among these benefits which dimensions stand out the most? The related hypothesis is that sustainable agriculture practices may have substantial and measurable benefits for human well-being and economic growth without harming the environment.

A panel of one hundred farmers was constituted. The interviewees were equally distributed in two groups: a target group (beneficiaries of the project) and a control group (vulnerable farmers non-beneficiary of the project). One of the main issues was to select non-beneficiary farmers at a level of vulnerability similar to the one of farmers selected for benefiting from the project. A preliminary survey allowed the interviewers selecting non-beneficiary farmers on the basis of their main job, income sources and land size.

2 to 3 hours long in-depth interviews then took place for the selected farmers in 10 villages of 5 representative communes. The villages were specifically chosen because they were the first to be project beneficiary and consequently the most susceptible to present significant differences in terms of farming practices. These interviews were conducted by the local staff of the MODE organization and students from the Royal University of Agriculture of Phnom Penh. Responses to the interviews were collected, translated in English and encoded in a common database. Analysis of variance was achieved using the groups as the explanatory variable. Statistical tests were performed in SPSS.

Results

Figure 1 shows the boxplot of the farm size in hectares as a function of the group: B stands for beneficiary and NB for non-beneficiary farmers. The central line shows the median, the bottom and the top of the box represent the first and third quartile, respectively and the ends of the whiskers show the minimal and maximal observed values of each group. No significant difference is observed between the two groups (p-value = 0.78). This result reinforced the idea that both groups are similar in terms of vulnerability. The farm size is indeed highly determinant in the Cambodian countryside for the standard of living. The two groups can thus be confidently compared. No significant differences could neither be observed in family structure or access to natural resources (such as water) or facilities (such as distance to main roads) between the two groups. All the results and statistical tests are summarized in Table 1.

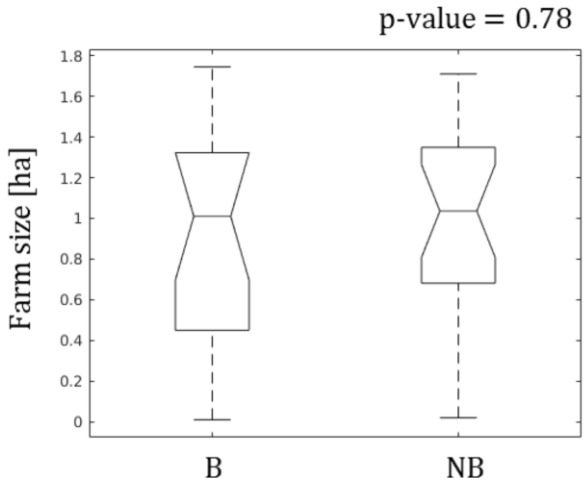

Figure 1. Boxplot of the farm size as distributed between the two groups. No significant difference could be observed.

However, several aspects were different between the two groups. First as shown in Figure 2, the total number of distinct products is significantly larger for the project beneficiaries. This suggests an increased diversity in production thanks to the adoption of the good agricultural practices lessons and the provision of agricultural kits (p-value = 0.008). This difference mainly comes from an increased number of produced vegetables and a more diverse animal husbandry. The p-values for the two latter tests reach 2.10^{-6} and 10^{-3}, respectively.

Table 1: summary of mean result values and statistical test results

	B			NB			p-value	significance
	Mean	Min	Max	Mean	Min	Max		
Farm size [ha]	1.05	0.05	1.75	1.1	0.09	1.7	0.78	
Family size	4.9	1	9	5	1	8	0.6	
Number of products	7.9	3	12	5.3	2	11	0.008	***
Number of detected risks	9.55	1	20	6.9	0	12	0.043	*
Number of produced vegetables	3.18	0	6	1.16	0	5	2.10^{-6}	***
Number of animal species	2.7	0	6	1.2	0	3	10^{-3}	***
Number of taken risk mitigation measures	5.1	0	11	2.6	0	6	0.006	***
Number of planned risk mitigation measures	2.5	0	5	0.4	0	2	10^{-4}	***

*significant at P<0.05 and *** significant at P<0.01
B = Beneficiaries, NB = Non-Beneficiaries

Similarly, the beneficiary group is much more aware of risks that may threaten their farm. On average, the beneficiary farmers recognized 9.55 risks identified by local partners against less than 7 for the NB group (p-value = 0.0429). Among these risks, the main differences concerned the problem of soil and water quality, the low availability of water resources, the climate changes and the lack of agricultural knowledge. Except for the latter, they are all included in the environmental pillar of the sustainability.

Finally, significant differences could also be found in the number of risk mitigation measures already taken (p-value = 0.006) or planned (p-value = 10^{-4}).

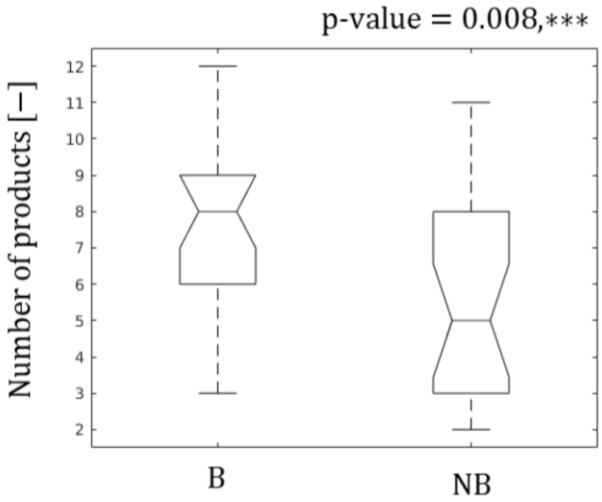

Figure 2. Boxplot of the farm size as distributed between the two groups. No significant difference could be observed.

Discussion

The conducted survey allowed us to observe and highlight significant differences between farmers applying good organic practices and other vulnerable farmers in terms of systems of production, threat perception and risk mitigation. The collected database can now and will be used in the near future (i) to determine the overall sustainability of the agriculture for the vulnerable farmers in Kampong Thom province, (ii) to calculate the percentage of farmers having adopted the practices learned during their training and using the material received several years before in their kit, (iii) to further assess the significant differences between the two groups in terms of general sustainability indices and (iv) to evaluate the most outstanding dimensions of the sustainability.

References

FAO, 2013, SAFA: Sustainability Assessment of Food and Agriculture Systems – Draft Guidelines.

National Institute of Statistics (NIS), 2014, Census of Agriculture in Cambodia 2013: Preliminary Report National. Phnom Penh: Ministry of Planning & Ministry of Agriculture, Forestry and Fisheries.