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UNDERSTANDING THE AGROECOLOGICAL PERFORMANCE OF SMALLHOLDER HOUSEHOLDS IN THE PERUVIAN ANDES

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Abstract: An interdisciplinary consortium of academic and development aid organizations was established to study the performance of agroecological smallholder households in the Northern and Southern Andes of Peru, between 2,000 and 3,700 meters above sea level. In order to collect information about environmental, economic and social dimensions, a household survey was conducted on a total of 305 households, including agroecological as well as conventional households. According to farmers' perceptions and based on several indicators, an improved performance could be stated in agroecological households. However, statistical strength of the aforesaid indicators is limited due to a non-probabilistic sampling method. The present study questions the belief that organic agriculture represents an intermediate state in the transition process from conventional agriculture to agroecology and show that the opposite might also be true.

Introduction:

Agroecology has its roots in peasant agriculture. The application of agroecology was introduced as a means to enhance the productivity of peasant farming systems in Latinamerica (Altieri, 1999). In the Andes mountain region, agroecology is commonly connected to rural development projects. Further research is required on the performance and the effects after implementation of such projects.

In this regard, comparative studies relying on household surveys are useful tools to investigate and compare the situation in agroecological as well as non-agroecological rural households. The design and the resulting data should however be analyzed carefully since there is a great variability among farms and confounding factors like time and intensity of project implementation, farm structure or participation in market-promoting activities. Whilst an increasing number of comparative studies exist on organic and conventional farming systems, particularly for commodities like coffee (Ugas, 2018), studies on agroecological or non-certified organic peasant systems in mountain areas are still very limited. The purpose of this study is to gain more knowledge on the agroecological performance of smallholder households in the Peruvian Andes.

Material and methods:

An interdisciplinary consortium of academic and development aid organizations in Peru and Belgium was established in order to study the performance of agroecological smallholder households in the Northern and Southern Andes of Peru. Recorded farms were located between 2,000 and 3,700 meters above sea level in the provinces of Aija (Ancash), Pachitea (Huánuco) and Calca (Cusco), where poverty rates ranged from 27 to 78 %.

An intensive work plan relying on the participation of NGO staff, researchers and students from seven universities resulted in the development of a household survey aimed at collecting information for a multi-criteria evaluation based on the farming system and three livelihood dimensions:

- The environmental dimension was based on indicators such as crop diversification, fertilization, pest, disease and weed management, soil and water use, disposal of pesticide containers, safety measures for pesticide applications, seed management, animal husbandry, veterinary care, solid waste management and climate change perception.
- The economic dimension included those on dynamics of income, land tenure, farm equipment and infrastructure, household characteristics, market dynamics, organic guarantee system, capacities for investment.
- The social dimension was assessed by indicators on family structure, migration, perceptions about farming approaches, organizational strengths and weaknesses, roles of women, knowledge about nutrition, perceptions about food security, food supply and family health status.

During the months of January and February 2019, a total of 305 households were surveyed, divided uniformly between the three regions and two categories:

- Agroecological households (AE) were selected based on their participation, for at least the last three years, in agroecological projects mostly with a strong initial focus on food security and dealing with farm diversification, soil and pest management practices, training, farmers' organization and promotion of local markets, often involving participatory guarantee systems.
- Conventional households (C) were selected based on their non-participation in those projects, on the use of conventional methods (mainly synthetic pesticides and fertilizers) and on the proximity with AE households.

This design and some limitations caused by a lack of information available, mainly the non-definitive lists of agroecological households and the variability of data between the three regions, implied the implementation of a convenience-based, non-probabilistic sampling method, which only allows an exploratory analysis. For each variable in the relevant parameters an AE/C comparison was established. Qualitative variables were analyzed using Pearson's Chi-squared independence test while for quantitative variables the Kruskal–Wallis test was used. For both tests, the null hypothesis was rejected when p-value is less than 0.05, considering in this case the existence of a significant difference between AE and C farms for the analyzed variable. For qualitative variables, in addition to the Pearson's Chi-squared independence test, the Cramer's V correlation was used to estimate the strength of the AE/C difference.

Results: AE farms implement more ecological practices (particularly various methods of organic fertilization), use fewer synthetic inputs and diversify more in terms of crops and economic activities (Figure 1). AE farms more frequently have an organic garden, usually run by women, for vegetable, small fruit and medicinal plant cultures. The survey highlights an increased use of small-scale pressurized irrigation systems by AE farms (0.5 ha per household on average), allowing intensification of production and up to 60 % savings on irrigation water during the dry season (Capoen, Gomero and Argumedo, 2013). Despite the above, there is a great variability of cases. 53 % of AE farms use synthetic inputs in

sections of the household (compared to 88 % in C farms), mainly in the larger plots for commercial purposes. Conversely, most C farms implement at least one organic fertilization practice and several farms implement other agroecological practices, which points out the great potential for an agroecological transformation at the landscape level. As a complement to the survey, qualitative analysis of a small number of soil samples revealed 20 to 305 earthworms/m^2 in AE farms and 0 to 15 earthworms/m^2 in C farms.

Our survey shows the tendency of AE farms to diversify market structure, as well as their ability to gain more regular customers and greater satisfaction with prices and income (Figure 2). Smaller household samplings revealed a higher profitability of AE farms despite an extra labor, however results based on this economic criterion are not statistically significant. The marketed volumes are small compared to the commercial crops sold on near and distant markets and usually marketed through middlemen.

Several parameters in the social dimension of the study (Figure 2) indicate a clear advantage for AE households, for instance in terms of associativity, improved leadership (lower in women) and preservation of traditional knowledge. More AE households state that they do not suffer from hunger or low food diversity and share the perception of food self-sufficiency and that their nutrition and their health status have improved.

Discussion:

Our findings question the notion that organic agriculture is an intermediate state in the transition to agroecology and point out that the opposite might also be true. Traditional households that use synthetic inputs in varying degrees need to focus their decisions on risk avoidance. Families' engagement to agroecology most often begins with an interest in eating healthy food, so the transition process commonly starts with an organic home garden, where the families, particularly women, have easier access to irrigation or manure from small animals and are closer to the house. Moreover, home gardens are important places for training and on-farm experimentation, for example the preparation of liquid fertilizers or seed production of vegetables. Then, as the transition to a more agroecological system advances, many of the skills learned in the home garden, including redesign towards a productive system with more synergy, are transferred to the rest of the farm, where more commercial crops (potato, fruit crops, beans, cereals) are cultivated. This is not always easy as many farms are made of several plots located at different altitudes and distances from the house, with variable land tenure conditions, establishing a mosaic of plots with sometimes very variable characteristics. In the transition process, labor and differentiated market shortages represent potential obstacles, as well as technical problems for which these households do not always find an alternative solution. Also, many of these farms may be confronted to the inability to sell their products as proper organic products since parallel production is not allowed by regulations. For these different reasons, many farms make a “truncated transition”. Hence, a different approach is needed in order to assure organic integrity on the marketplace and facilitate a sensible and realistic transition towards more sustainable traditional agroecological farming systems in the high Andes.

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References: Altieri, M (1999): Applying agroecology to enhance the productivity of peasant farming systems in Latin America. Environment, Development and Sustainability 1(3–4): 197–217.

Capoen, E, Gomero L, Argumedo F (2013). Escalamiento de innovaciones campesinas de tecnologías agroecológicas para el fomento de la agricultura sostenible: el caso del programa Tierra Sana y Soberana en Áncash, Perú. In: Escalando innovaciones rurales, 149-165. IEP – IDRC – FIDA. Lima, Perú.

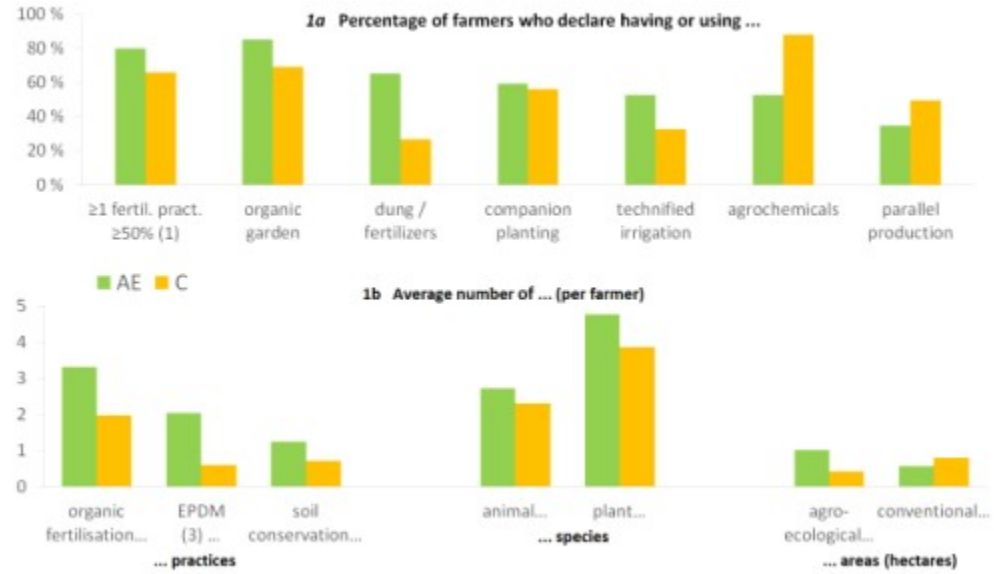
Ugas R (2018): Organic agriculture and agroecology in Latin America. In: Kopke U (ed): Improving organic crop cultivation. Burleigh Dodds Science Publishing Limited. Cambridge, UK.

Image:

Figure 1

AE / C comparison for productive-environmental variables

Data from the general IMPAC survey, 2019



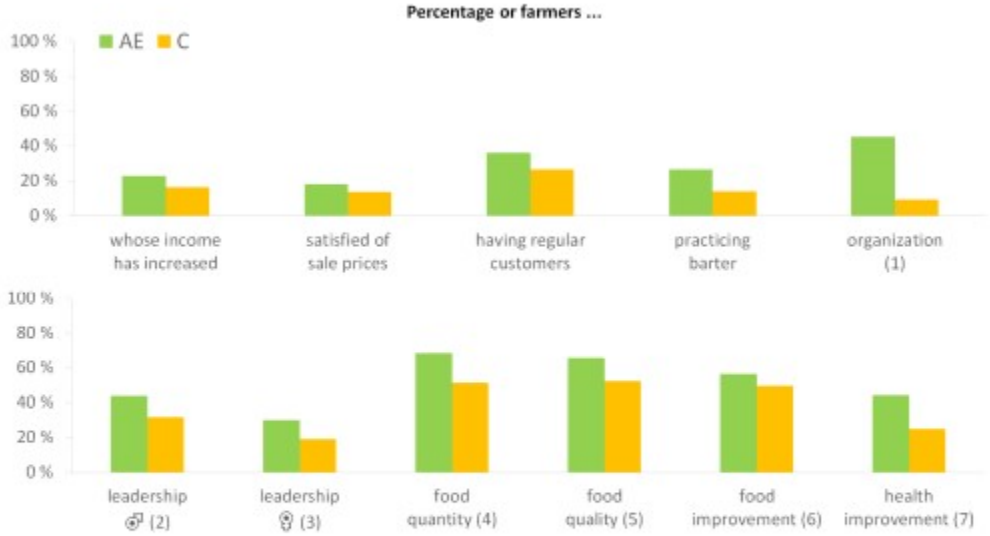
(1) Using al least 1 organic fertilization practice in more than half of their farmland.
(2) Using the manure of their animals to prepare organic fertilizers.
(3) Ecological Pest and Disease Management.

Image 2:

Figure 2

AE / C comparison for socio-economic variables

Data from the general IMPAC survey, 2019



(1) % of farmers who declare belonging to a farmer organization.
(2) % of male farmers who declare having held a leadership position in the last year.
(3) % of women farmers who declare having held a leadership position in the last year.
(4) % of farmers who declare not having lacked food in the last year.
(5) % of farmers who declare not having had to limit the variety of foods in the last month.
(6) % of farmers who declare that the quality of their food has improved in the last 5 years.
(7) % of farmers who declare that the presence of diseases in their family has decreased in the last 5 years.

Disclosure of Interest: None Declared

Keywords: Agroecology, Andean agriculture, Household survey, Multi-criteria evaluation