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Evaluating changes in an agricultural intervention project in the Central Andes

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A project participant in Peru told us: "*My parents had cultivated vegetables for many years. The cultivation was natural with no agrochemicals at that time. In the last decades, the promotion of pesticides and chemical fertilizers had improved production for the market, but pesticides were negatively affecting my family's health. I was the youngest sister and several of my brothers suffer from different health problems. My husband participated in the farmer field school of HortiSana and learned how to cultivate healthy vegetables. Now we sell part of the production to the organic market and the rest is used for family consumption as natural products are good for our health.*"

Another participant declared: "*I participated in the project because I had the curiosity to participate in the trainings to know how to prepare compost, to meet new people and also I thought the project was going to give seeds as reward for participation. I didn't participate in all training sessions, and neither was I optimistic about the producer association the project was encouraging. I continued using pesticides on my cash crops to increase production even though I suffered a pesticide poisoning after finishing HortiSana training.*" In the end, she quit the association.

Such differences in perceptions of participants are common in projects. Given the divergent views, how can one identify the full range of experiences and then make sense of them? This article shares an experience of how we tried to do so among small vegetable producers in the Andes in 2010.

Reviewers: Sonal Zaveri
Irene Guijt

Introduction

Evaluation approaches evolved as a consequence of improved understanding of the processes through which adoption and impact of technologies take place.

In the 60s and 70s, project evaluations mainly used cost-benefit analysis focused on short term outputs, and with comparison groups and pre-determined indicators (Dupuis, 1988). In the 80s, participatory evaluation approaches emerged and were rapidly incorporated into project evaluation to enhance beneficiary ownership (Chambers, 2007), while rejecting external imposition of indicators. However, the need for accountability of public funds (national or international) and trustable, quantitative data for policy decision making remained (Jones, 2009; Holland, and Campbell, 2005). This led to calls for 'rigorous impact evaluation approaches' to assess long term changes to which a particular intervention attributes.

However, in complex interventions, long time periods may lapse between intervention causes and effects, while multiple causes may result in a range of effects. Hence, some donor agencies are promoting assessment of projects through their outcomes (Oakley et al., 1998), recognizing the impact of complex contexts where interventions take place (Rogers, 2008). 'Outcome evaluation' is one way of assessing welfare improvements for a certain population. It focuses on proximate changes in knowledge, attitudes and practices, rather than distant impact welfare indicators that result from multiple actions by different actors and agencies (Roche, 1999). Outcome changes may be more easily identified and measured, and linked to the activities of particular projects (Earl et al, 2001).

Furthermore, outcome evaluation based approaches permit the use of a balanced mix of quantitative and qualitative methods. Quantitative methods produce data that can predict relationships and be aggregated, while qualitative methods enhance the quantitative data through participant-based identification of outcomes and the mechanisms through which they occur as well as provide different perspectives (Bamberger, 2000; Berg, 2003). Also, qualitative research can help to probe and explain relationships among variables and to explain contextual differences in the nature of those relationships. The most relevant considerations for the adoption of mixed methods approach is the use of theory-based evaluation approach to address the evaluation question, the definition of a credible counterfactual to address the issue of selection bias and being systematic in data collection and analysis (Weiss, 1998; White, 2002; Spencer et al, 2003).

We developed a mixed method approach to outcome evaluation for the HortiSana project, an agriculture-for-health intervention in two middle-income Andean countries. In this paper, we describe the staged development of our approach and the methodological steps in its implementation. The findings show that mixed methods are useful and hard, but feasible in the context of agriculture-related interventions in developing countries and provide insight into the heterogeneity of farmer groups and their responses to interventions (Paredes, 2010).

The project context

Andean countries have enormous potential for organic production due to the variety of agro-ecological zones and cultural roots in native Andean agriculture (Altieri and Toledo, 2011). Nevertheless, the Peruvian and Ecuadorian agro-ecological movements are very small – formed by the networks of NGOs, national and regional producer associations, organized consumers, export producers, and other academic and political personalities (Manrique and Cruzalegui, 2006). Peru has around 92,000 organically certified hectares, half for fruit, one third for coffee, and just 0.5% for vegetables. In this context, health impacts of pesticides in conventional production has been documented that corroborates fears (Sherwood et al, 2005; Cole et al, 1998).

Governments and non-government organizations in Andean countries have promoted a variety of healthy and sustainable production initiatives (Alvarado, 2004; Antle et al, 1998; Arce et al, 2006). *HortiSana* was a project that ran from 2007 to 2010 in the Central Andes, aiming to improve the livelihood of smallholder farm households through the production, consumption and commercialization of 'healthy' vegetables produced with no or fewer agro-chemicals.

Information about vegetable production was gathered early on in the project through a participatory situation diagnosis in the Metropolitan Regions. Among these were Píllaro, Ecuador, and the Mantaro Valley, Peru. Both locations are connected to regional markets and smallholder agricultural producers are predominant. Male migration, water, adequate markets and pests and diseases were all mentioned as challenges. We then conducted a household baseline survey in early 2008 to capture characteristics of households and agricultural production (see Leah et al, 2012). Respondents were small scale horticultural producers in the Pillaro Canton in Ecuador (214 respondents), and Huancayo and Chupaca provinces in Peru (215 respondents).

Summary of the project intervention

One of Hortisana activities between 2007 - 2010 (Prain et al, IDRC report, 2011; Cole et al, forthcoming) was farmer field schools (FFS), a type of activity that the International Potato Center (CIP) had already managed and evaluated (Ortiz et al. 2008). HortiSana ran four FFS in Peru and six in Ecuador for 47 and 91 horticultural producers, respectively. The low number of beneficiaries, especially in Peru was caused by problematic implementation by an external organization and lost confidence among many farmers (Pacheco, Pradel and Ramos, 2009).

The FFS were designed to promote healthy agriculture through the use of bio-fertilizers and bio-pesticides. HortiSana also sought to organize a group of producers in producing and marketing healthy agricultural products, which involved entering a still precarious organic market that the project promoted in both countries. The most motivated participants in Peru formalized one association (17 members) and in Ecuador, an existing farmer association (16 members) was strengthened. Both organizations sought to take advantage of business opportunities around the notion of 'healthy markets': Santa Catalina Association with a compost production plant in Ecuador and Tamia Association with a 'bio-feria' (organic market) sales scheme in Peru.

Laying the basis for the summative evaluation framework

The evaluation approach was designed when the project started in 2007, but it was modified several times over the years in response to changing internal and context conditions. The overarching evaluation question remained: '*Did Hortisana interventions contribute to change attitudes and/or practices of the participants?*' This question initially had a set of related objectives that were more research oriented than evaluation oriented.

At a team retreat, we agreed on the need to use an impact pathway approach with an explicit theory of change. This change in how evaluation was conceptualized implied that project impact should not be defined by formal project boundaries but, more broadly with active consultation of beneficiaries and stakeholders.

The theory of change (Anderson, 2005) was seen as an important initial step to shift from a objective-based to an outcome-focused project. The theory of change was developed between March and June 2009 with contributions of local coordinators and assistants in Peru and Ecuador, as well as headquarter staff. During a one week virtual workshop in March, the outcomes were defined based on project objectives and the first two years of project experience. The resulting theory of change (see Figure 1) included a central overall goal, surrounded by four outcomes, each with distinct pre-conditions. Although we had project objectives from the onset, this process helped convert them to outcomes around which to focus our attention.

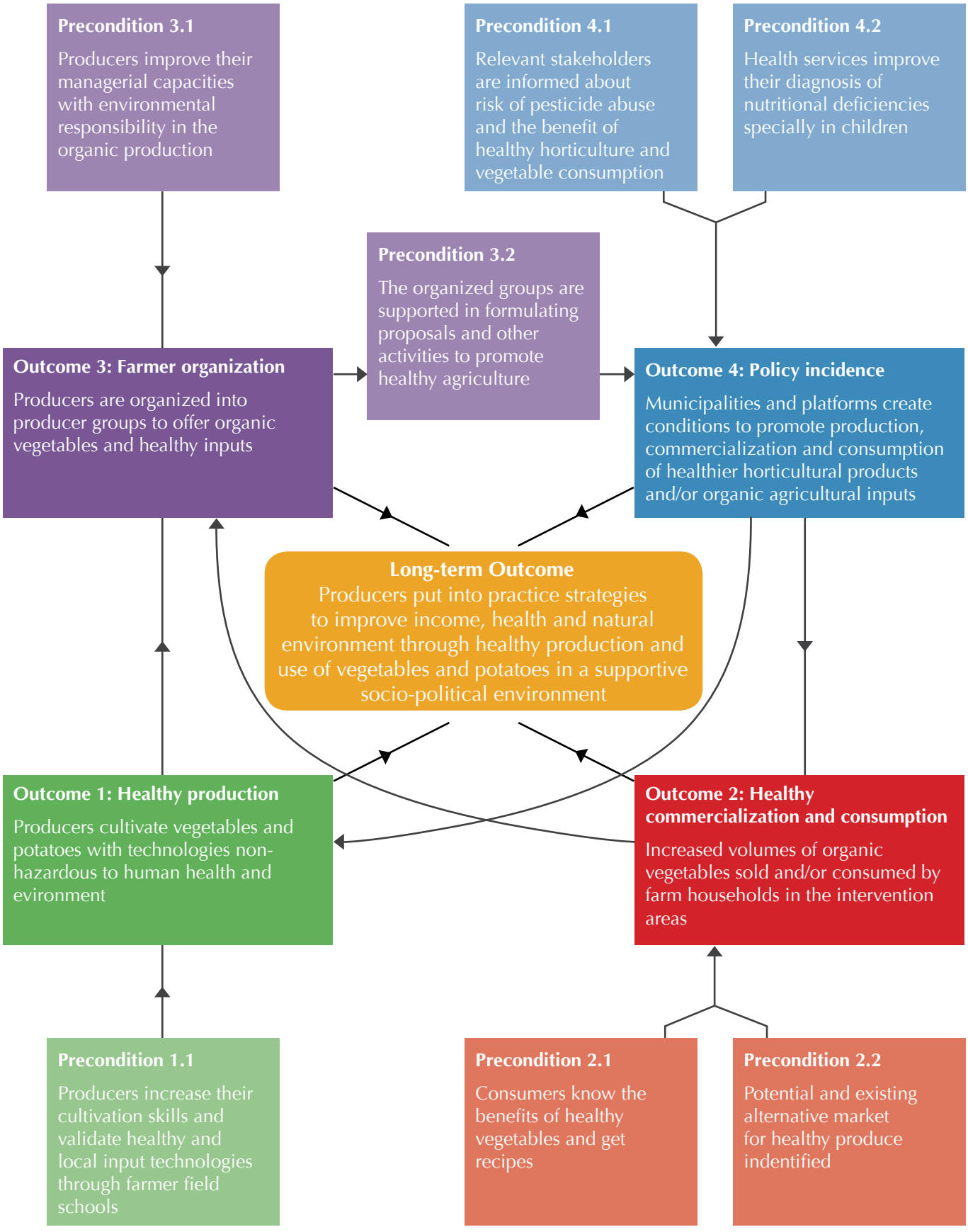
Designing a summative evaluation approach

From the start, Hortisana wanted a mixed method evaluation approach to build on the strengths and mitigate the weaknesses of quantitative and qualitative methods (Creswell and Plano Clark, 2007). Initially, a large repeat household survey had been envisaged. However, the time required managing and analyzing paper-based questionnaires from the baseline household survey, and the relatively small numbers of initially surveyed households who participated in the FFS and other interventions, changed the mind of the evaluation team. Nevertheless, some summative evaluation remained necessarily, primarily focused on changes to which the Hortisana interventions could reasonably be expected to contribute.

The criteria for the evaluation design and the decision to use a theory of change framework was decided by the project leaders (Gordon Prain and Donald Cole), the project's evaluation specialist (Willy Pradel) and an evaluation consultant (Steve Sherwood) in coordination with the project officer assigned by the donor (International Development Research Center of Canada) during several months of interaction between late 2009 and early 2010.

The methods used for the outcome evaluation had a sequential design with qualitative data collection and analysis followed by design of a quantitative instrument based on these findings, which was administered to a purposive sample of households (see Figure 2). Table 1 summarises methods used, roles of evaluation team and stakeholders, timeframe and target populations. The use of specific methods was influenced by the evaluation team's experience, such as Sherwood with Most Significant Change – (Sherwood and Borja, 2009), and Pradel with Q methodology (Warnaars and Pradel, 2007).

Figure 1: Theory of change HortiSana, 2009



We planned to triangulate our results from different methods to understand changes, their causes and their value according to our theory of change and potential explanations for other unintended outcomes. To ensure analytical continuity, all steps where sequential with one person coordinating the summarizing of results from each step to be used in subsequent steps of the evaluation.

Evaluation methods and their implementation

In 2010, the Most Significant Change (MSC) was used to identify changes (Davis and Dart, 2005) that participants experienced in relation to our outcomes of interest. MSC is a participatory evaluation method used to collect short stories in which stakeholders describe a significant change they attribute to a project. An adaptation to a small-scale project was needed as the methodology was initially designed for large-scale projects.

In both regions, stakeholder workshops were held to ensure common 'domains' into which one could classify stories and identify possible story tellers. In Ecuador, the stories were shared and documented using a pre-defined questionnaire that did not produce sufficient information to understand the changes. In Peru, a recorded interview made by the evaluation specialist was conducted with probing questions to surface details about changes or contextual factors important to explain. In all, 26 stories were collected in Pillaro, Ecuador and 18 in the Mantaro valley, Peru. Of these, 14 stories were from institutions and 30 from producers.

Subsequently, one day workshops in both countries took place to select the most significant stories from the full set collected. In Ecuador, the 16 participants were from NGOs, Ministry of Agriculture, Local Agricultural University, and the farmer's organization, while in Peru 12 participants from NGOs and farmer organizations were involved. Producers outnumbered institutional representatives in the workshops, which influenced the story selection process leading to more emphasis on the more dramatic producer changes than institutional changes.

Despite the bias in specific story selection, the generic domains of change informed the design of quantitative methods. Two methodologies were proposed: the Q methodology to understand changes in producer attitudes and a focused follow-up survey to quantify changes in producer practices. Both were primarily relevant to Outcomes 1 and 2 of HortiSana's theory of change, leaving Outcomes 3 and 4 to be documented through complementary methods (analysis of stakeholder and organizational meetings, market surveys, etc. as per Prain et al., 2011). We shall focus on Outcomes 1 and 2 here.

Figure 2: Graphical representation of the process used to understand changes in attitudes and practices in HortiSana project in Peru and Ecuador, 2010

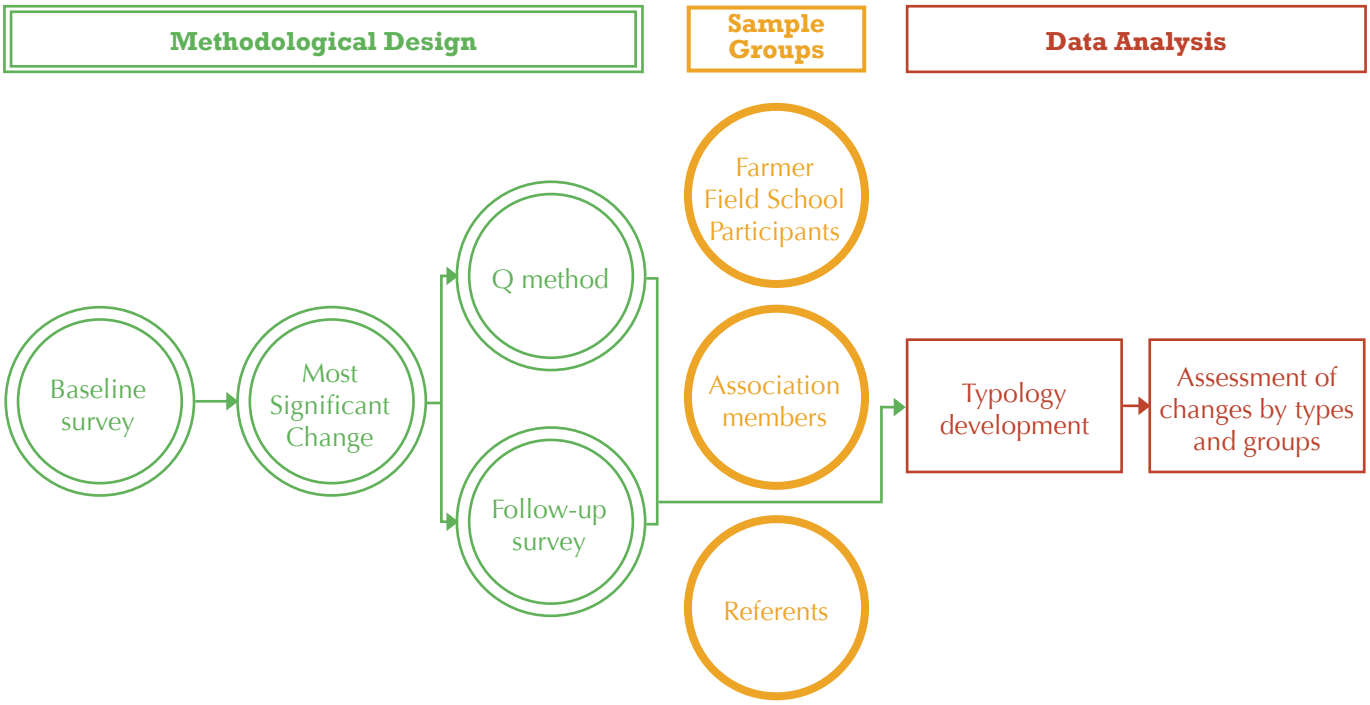


Table 1: Evaluation component implementation by method utilized

Method	Evaluation Purpose	Team members involved	Time period conducted & duration, by stage	Population Involved
Baseline survey	To provide inputs to intervention design & baseline information for comparison with follow-up	• MR coordinators in Peru and Ecuador • M&E HortiSana project specialist • Project leaders • CIP entomologists • Nutrition Research Institute Specialists • University of Toronto, Public health graduate student • External data entry consultancies • Enumerators	Preparation: January – May, 2008 (4.5 months) Execution: May - June, 2008 (1.5 months) Data entry: July 2008 - February 2009 (Peru: 8 months) July 2008 - September 2009 (Ecuador: 15 months)	215 farmers from Peru and 214 farmers from Ecuador
Most Significant Change	To reveal the most important changes from the perspective of producers and key stakeholders	• MR coordinators in Peru and Ecuador • M&E HortiSana project specialist • Project leaders • Local stakeholders • External consultant (Steve Sherwood)	Training: March, 2010 (1 day) Data collection: April - June, 2010 (3 months) Selection: July, 2010 (1 day)	18 stories from Peru and 26 stories from Ecuador were collected
Q method	To assess perceptions of beneficiaries in comparison with a referent group who did not participate in HortiSana interventions, using the phrases and information from the most significant change approach	• MR coordinators in Peru and Ecuador • M&E HortiSana project specialist • Project leaders • Enumerators	Preparation: September, 2010 (1 month) Data collection: October, 2010 (2 weeks)	Beneficiary groups (98 respondents across FFS participants and Association members) and the referent group (102 respondents)
Follow-up surveys	To capture behavioral changes in categories revealed through use of most significant change	• MR coordinators in Peru and Ecuador • M&E HortiSana project specialist • Project leaders • Enumerators	Preparation: September, 2010 (1 month) Data collection: October, 2010 (2 weeks)	Beneficiary groups (98 respondents across FFS participants and Association members) and referent group (102 respondents)
Typology development	To understand distinct producer types and make subsequent comparisons across them	• M&E HortiSana project specialist • Project leaders	Data analysis: November, 2010 – January 2011 (3 months)	Beneficiary group (98 respondents) and referent group (102 respondents)

CIP = International Potato Center
FFS = Farmer Field Schools
M&E = Monitoring and Evaluation
MR = Metropolitan Region

The stories formed the basis for using the Q methodology, which permits quantification of subjective perceptions and clustering of people with similar perceptions or preferences (Brown, 1993) (see Box 1). The analysis uses correlation and factorial tests to reveal patterns in perceptions or preferences (Webler et al, 2009). Examples of the practical use of this technique in agriculture can be found in Cools et al. (2009) and Warnaars and Pradel (2007). The method allows examination not only of differences in how project participants think compared with with those not involved from a referent group, but also to understand whether changes have occurred in practices and attitudes for particular types of participating producers.

Box 1. The Q methodology: Brief description

Among the discourse analysis techniques, the Q methodology was developed by the psychologist and physicist William Stephenson from Oxford University in 1935. The discourse analysis techniques analyze text in order to find subjacent patterns or meanings to explain social perspectives that exist on a particular topic. The Q methodology, in particular, has the advantage that the answers are directly comparable because all respondents are related to the same set of phrases (Webler et al, 2009)

Stephenson designed a technique to measure subjectivity through an exercise of ordering and classifying phrases to minimize the research bias. The concourse or phrases set refers to the collection of all the possible statements people can think about on a particular topic and should contain all relevant aspects of the topic (Brown, 1993). The concourse is presented to the respondents and they are asked to rank order the phrases according to their degree of agreement or disagreement on an ordinal scale.

Q methodology rearranges the positions of the rows and columns in the database. In Q, the 'respondents' are moved to the columns and the 'statements' to the rows. Then correlation and factorial analysis is applied as statistical tests to elucidate the patterns of social perspectives (Webler et al, 2009). In this way, the focus of the factorial analysis changes to the interrelations among people based on the individual patterns of all the evaluated characteristics and not to the inter-correlation of the individual characteristics based on how many people answered the test (Cools et a, 2009).

The project coordinators, CIP staff and selected producers in the intervention sites selected and validated 26 phrases or Q statements coming from the transcribed stories. These statements were arranged in four categories that reflected the most important changes and impacts found in the HortiSana project: (1) use of agro-chemicals, (2) perception of working in an association, (3) training and applying improved skills, and (4) vegetable consumption.

A follow-up survey included the Q methodology as well as questions regarding perceived practice changes in the use of agro-chemicals, and production and consumption of vegetables. The Q-sort technique involved participants ranking the set of statements along a spectrum from 'agree' to 'disagree'. A typology based on the Q-sort used rotated factor analysis through Varimax rotation of the correlation matrix to generate factors that explained most of the variance in the Q-sort. Subsequently, producers were grouped into 'factor types' that was the closest fit with their individual factor loadings. Once producers were grouped, then statistical analysis was performed to find similarities and differences across groups.

In total 200 respondents were interviewed in the follow-up survey in Peru and Ecuador (102 referent respondents, 70 FFS participants promoted by HortiSana and 28 association participants promoted by HortiSana). From these respondents, 130 also participated in the baseline survey.

The counterfactual or referent group was described as producers who cultivate vegetables in the same district as project intervention but with no involvement. Due to sensitive health-related questions, the baseline survey sought and received ethical approval from the authorized institution (The Nutritional Research Institute). The follow-up survey did not have such sensitive questions so verbal agreement was adequate.

Quantitative and qualitative results

1. The most significant changes for project participants

Farmers participating in the project and institutions collaborating with the project shared 44 stories, from which a total of 12 changes were identified (see Figure 3).

The most important change was that training in fertilization management and pest management made

an important contribution to managing their fields in a healthier way. It also helped them to reduce costs associated with buying agro-inputs. Also common was the emphasis on vegetable consumption, as most farmers traditionally based their food intake on carbohydrates including potatoes. Learning new and traditional recipes using vegetables was considered a plus.

Intervention-associated effects differed between the countries in relation to the adoption of treated manure. While in Peru it was the strongest training component, in Ecuador it was incorporated as an organization's business opportunity. Therefore, more project beneficiaries in Peru valued the project's contribution resulting in their use of different treated manure techniques, such as compost, bocashi and biol for soil fertility enhancement. Contributions to pesticide reduction and greater income were more evident in Ecuador where pesticide use was more intense prior to the project, than in Peru. Also in Ecuador, the business plan was implemented better, and supported women's leadership, improving women producers' self-esteem.

2. Farmers' attitudes about healthy vegetable production

The follow-up survey was undertaken in late 2010, and analysed by the evaluation officer (Pradel) with project leader support. The Q-sorts were analyzed partly using the percentage of variance explained by each factor. The three main factors explained 57% and 59% of the total variance found in the Q-sort of the Q statements from Ecuador and Peru, respectively. The three main factors loaded on similar phrases in both countries. Therefore, the name and description of the factors were valid for both, except when differences are highlighted (see Box 2).

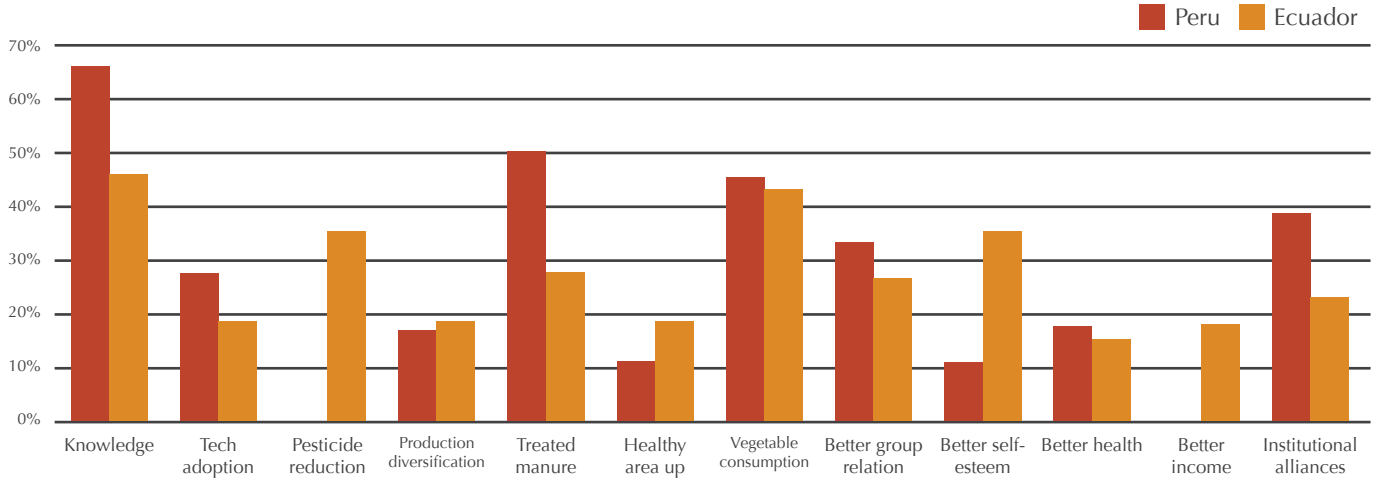
The three most important explanatory factors were: **Factor 01** which we named '**environmental consciousness**' explained 39% of the total variance in Ecuador and 44% in Peru; **Factor 02** which we named '**risk aversion**' explained 12% of the total variance in Ecuador and 11% in Peru, and **Factor 03** which we named '**low social capital**' explained 6% of the total variance in Ecuador and 4% in Peru.

'Environmental consciousness' was present among most farmers in farmer field schools sponsored by HortiSana and members of the associations (Tamia and Santa Catalina) promoted by HortiSana. 'Risk aversion' was most common in the non-participating referent group. 'Low social capital' was most common among FFS participants in Peru (Figure 5). It is interesting to highlight that the environmentally-conscious producers were younger in Peru than in Ecuador.

3. Perceived changes in relation to agro-chemical use in vegetable production

After the intervention, most of the 'environmentally conscious' farmers had stopped using red label pesticides (Table 3). Those changes were marginally greater among FFS participants and association members compared to the referent sample that belonged to this group. The 'risk averse' producers reduced the use of red label pesticides to a lesser extent. The 'low social capital' farmers (F3) behaved differently in Peru and Ecuador. In Peru, they were

Figure 3. Percentage of stories that fit into the different change areas identified using the Most Significant Change method in Peru (26 stories) and Ecuador (18 stories), 2010



organic producers and as a consequence, 100% did not use any red label pesticides. In Ecuador, fewer farmers from this group eliminated the highly toxic pesticides.

Looking at changes in the number of plots with no use of agro-chemicals and the number of vegetable type planted, it is clear that the 'environmentally conscious' farmers had the largest improvement in both countries. Improvement was greater among those who participated in HortiSana in Peru, while in Ecuador, no difference where found between the 'environmentally conscious' farmers from either the referent group or HortiSana participants.

Box 2. Procedure to get the description of factors

The analysis of Q-sort using the percentage of variance explained by each factor produced several factors (Figure 4). The three main factors explained 57% and 59% of the total variance found in the Q-sort of the Q statements from Ecuador and Peru, respectively. The three main factors loaded on similar phrases in both countries, those phrases describe the factor; therefore, the name and description of the factors are valid for both, except when differences are highlighted.

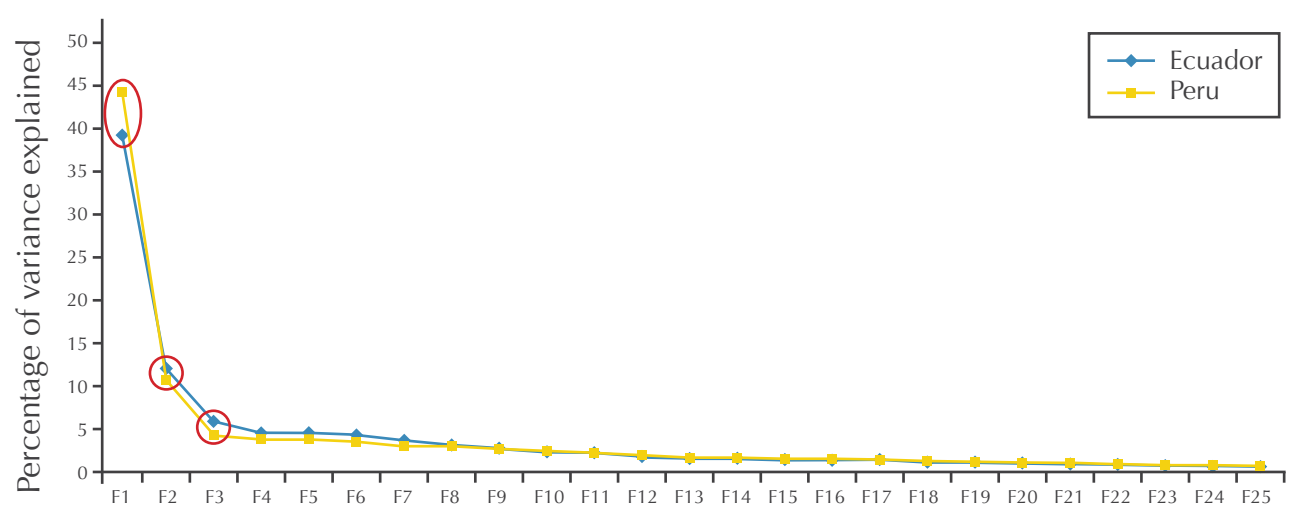


Figure 4. Variance explained by factor using rotated factor analysis with Varimax rotation

Factor 1, for example, explained 39% of the variance in Ecuador, and 44% Peru. The statements with the highest absolute value of the factor loading among the 26 statements for this group in Peru were:

Statement 21: I used more chemicals than before (factor loading: -1.91)
Statement 12: The agro-chemicals don't harm me (factor loading: -1.74)
Statement 19: I can't stop using pesticides (factor loading: -1.52)
Statement 08: I have to produce with pesticides (factor loading: -1.51)
Statement 25: Applying pesticides frequently makes me stronger (factor loading: -1.12)
Statement 02: At home we eat very few vegetables (factor loading: -1.11)
Statement 26: We don't have time for training activities (factor loading: -1.06)

Statements with higher factor loading represents the behavioral attitudes of the respondent on the subject in question, therefore the characterization of the group, depend on the interpretation of the evaluator about the factors loaded. As most of the phrases are related to the negative impact of pesticides and agro-chemicals, we defined this group as: 'environmentally conscious', where producers regarded the use of agro-chemicals as unhealthy. They use less agro-chemicals now because they think it is possible to achieve a good harvest without their use. They have learned how to produce with integrated crop management (ICM). They can manage their time to receive training, which is important as ICM is knowledge intensive. Further, this type of producer values the consumption of vegetables. Similar analysis applies for the other groups and country.

Figure 5. Distribution of different factor types of producers within each follow-up survey groups in Peru (n=100) and Ecuador (n=100), 2010.

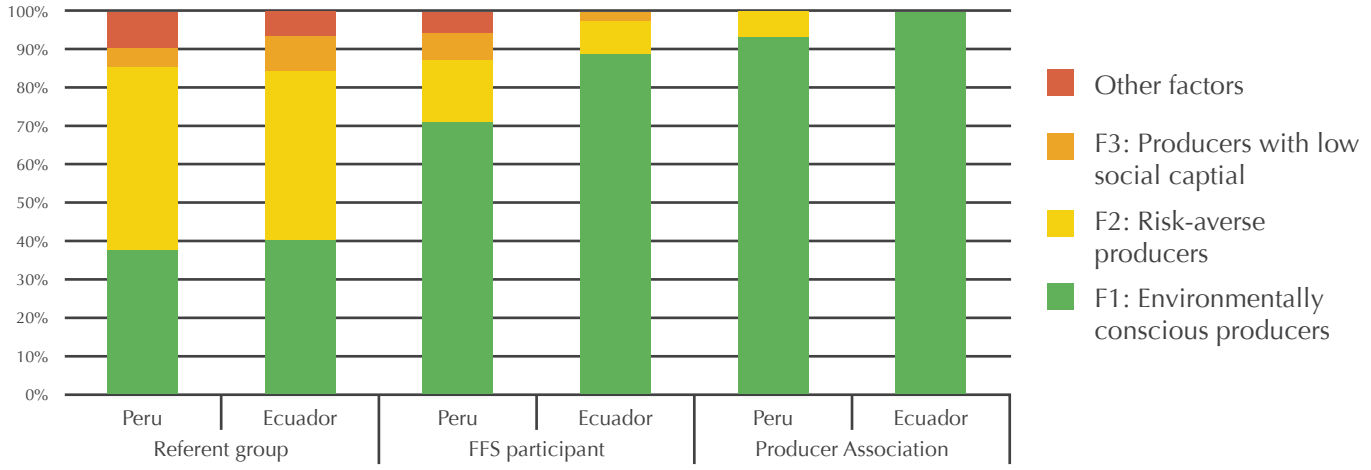


Table 2. Changes in pesticide use after Hortisana interventions by group, factor type*, and country (2010 Follow-up survey. N: Peru=100, Ecuador=100)

		% of farmers who has diminished or eliminated red label use		Number of plots with no agro-chemicals (% change wrt 2 yrs ago)	
Group	Factor Type*	Peru	Ecuador	Peru	Ecuador
Referent	F1	84%	67%	1.89 (29%)	2.62 (205%)
	F2	42%	48%	0.25 (213%)	0.30 (-70%)
	F3	100%	40%	2.5	1.20 (50%)
	Other	20%	100%	0.20 (-60%)	0.33 (0%)
FFS participants	F1	88%	81%	1.79 (79%)	2.06 (168%)
	F2	40%	67%	1.2 (20%)	1.00 (49%)
	F3	100%	0%	0.33 (-51%)	2.00 (0%)
	Other	0%	---	1.0 (100%)	---
Association	F1	86%	85%	1.79 (258%)	2.31 (273%)
	F2	0%	---	0.00 (0%)	---

*F1= "Environmentally conscious producers", F2= "Risk Adverse producers" and F3="Low social capital producers"

4. Perceptions about vegetable diversity and consumption

With regard to the number of vegetable types planted, the 'environmentally conscious' group had the largest positive change, and there was an important difference between the HortiSana participants with respect to the referent group. Also, we could observe that changes in vegetable consumption were greater among Ecuadorian farmers than among Peruvian farmers (Table 3).

Discussions and final thoughts

Final thoughts on evaluation results

The results presented show positive changes among HortiSana participants according to the theory of change, even though changes in the production and consumption of healthy vegetables are also evident to a lesser extent in the 'environmentally

Table 3. Changes observed in vegetable production after HortiSana interventions by group factor type* and country (2010 Follow-up survey. N: Peru=100, Ecuador=100)

		% of farmers who increased vegetable consumption		Number of vegetable types planted (% change wrt 2 yrs ago)	
Group	Factor Type*	Peru	Ecuador	Peru	Ecuador
Referent	F1	37%	71%	4.16 (13%)	8.24 (116%)
	F2	21%	52%	3.88 (11%)	1.71 (-18%)
	F3	100%	0%	3.00 (50%)	1.00 (-67%)
	Other	40%	67%	0.75 (-83%)	2.67 (-11%)
FFS participants	F1	60%	97%	5.79 (10%)	7.77 (177%)
	F2	40%	33%	4.00 (11%)	3.00 (12%)
	F3	0%	0%	2.33 (-22%)	10.00 (11%)
	Other	50%	---	4.50 (80%)	---
Association	F1	86%	92%	9.21 (193%)	7.77 (94%)
	F2	0%	---	6.00 (20%)	---

*F1= "Environmentally conscious producers", F2= "Risk Adverse producers" and F3="Low social capital producers"

conscious' comparison group farmers. This result emerged from the project's training work on healthy vegetable production and consumption. However, progress with vegetable marketing was flawed. The project was unable to increase demand and price of healthy vegetables within the project timeframe, notwithstanding several initiatives towards this end, including government actions.

Strategic interventions in Peru and Ecuador cannot be similar due to cultural and social differences in rural settings. For instance, the 'risk averse' producers in Ecuador are reducing areas free of pesticides and planting less diversified products, while in Peru this group is more prone to diversify vegetables but using chemicals.

We observed that the associations working with HortiSana have shown positive changes with respect to attitudes, reduction of agro-chemical use and increase in number and amount of vegetable consumed. These organizations have improved their social capital and, therefore, are promoting the use and marketing of organic products with better capacity to support transitions towards organic enterprises.

Our research indicates that policy interventions on organic agriculture are creating a collective, critical mass interested in healthy and sustainable production that projects such as HortiSana can assist. The Q method highlighted that the proportion of 'environmentally conscious' farmers (58% in Peru and 65% in Ecuador) dominate over other factors, which is positive and give some hope for a possible spillover effect towards healthy vegetable production. However, limiting factors, especially fair markets for these products (Murray and Loomis, 2006) still make this livelihood approach unsustainable.

These results fulfilled our evaluation purposes, demonstrating changes that were consistent with the logic expressed in our theory of change. Evidence of the project's contribution to behavior and practice changes of intended beneficiaries were presented to donor and collaborating stakeholders. However, we could not verify the changes in pesticide use nor attest to the changes in vegetable consumption reported, except for periodic field observations. Both the self-reported changes and activities observed by research team members may have been atypical with participants wanting to demonstrate change consistent with project goals.

Results of this evaluation were shared with project partners in both countries, especially The Ecuadorian Center for Agricultural Services (CESA) in Ecuador; and the Ecumenical Center for Promotion and Social Action (CEDEPAS) in Peru. These organizations are committed to continue the HortiSana experience and were interested on changes towards organic production for local markets produced by the HortiSana intervention.

Final thoughts on the evaluation approach

The evaluation approach presented in this paper followed the considerations made by researchers such as White (2002) and Spencer et al. (2003), in that the methods and rationality of the outcome-based evaluation applied in HortiSana project followed the principles of a mixed methods design. Results emerging from carefully sequenced qualitative and quantitative methods helped answer our research questions and generated insights about changes induced by the project. The systematic and transparent implementation, following the proposed evaluation approach, provided results credible to peers. The short duration of the project and few participants made the chosen highly interactive methods possible. For efforts over longer time periods with more participants, our strategy might have been different. A stronger focus on impacts (not only behavioral changes) would have required field verification of stated changes.

Challenges were faced in designing and implementing the evaluation. Starting with defining the project goal and intermediate outcomes, we realized that the regional coordinators had diverse perceptions of expected project outcomes, probably due to contextual differences. We needed more time than expected in virtual conferences to develop common ground on this crucial issue.

A second challenge was to convince the local coordinators that the new methodologies provided good options for evaluating the project. The workshops were mainly coordinated by agronomists, who were also in charge of the survey of identified changes and the Q-sorting. Staff required considerable support in implementation. Their discomfort arose from more familiarity with questionnaires that ask producers for quantitative information. Agricultural professionals are hesitant about qualitative approaches, with training needed to explain technical aspects of the methodology (the need for a quasi normal distribution of q-sorts and standardization of the q-statements) and convince them of their utility.

Still, in some cases the evaluation officer had to collect the information when data was not useful, as the case of the story collection in Peru. Therefore, training is needed for applying this evaluation approach as well as critical analysis of results being produce by the methodologies. Staff were trained on MSC and the Q methodology to ensure data quality; around two weeks per methodology, with literature, direct training, and methodological validation in the field.

Nevertheless, for projects with the financial and time flexibility and technical support, our approach can provide valuable information for understanding changes from project interventions.

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