

Evaluation of Pachamama Raymi's short post-disaster project in Yauyos, Peru



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Date 29 July 2012

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**Bachelor thesis Land Degradation and Development Group submitted in partial fulfillment of
the degree of Bachelor of Science in International Land and Water Management at Wageningen
University, the Netherlands**

Study program:

BSc International Land and Water Management (BIL)

Student registration number:

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YEI 80812

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Date: 29 July 2012

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1. Introduction

Although poverty rates have been declining over the past years, still 31.3% of Peru's population lives below the national poverty line (World Bank¹, 2012). Especially in the rural areas poverty rates are high (World Bank², 2012). This Poverty in combination with the geographical setting of the country, which is prone to natural disasters like earthquakes, makes the rural area vulnerable.

This vulnerability was exposed after the 2007 earthquake in Peru. The earthquake's epicentre was near the coast of the Province of Ica and had a magnitude 8.0 (Reuters, 2007; USGS, 2007). Although the southern coastal regions were affected most, several mountain districts had to deal with the effects of this natural disaster as well. After the earthquake, several relief programs were implemented in highland communities to overcome the damage and prevent high levels of migration (GTZ, 2007). After emergency relief, as indicated the emphasis shifted to rebuilding critical infrastructure and improving living standards in the affected areas (GTZ, 2007).

One of these programs was the post disaster program Ayuda al Perú (AYUPER, translated 'help for Peru'). AYUPER was executed between April 2009 and June 2010 in the provinces of Yauyos, Castrovirreyna and Huaytara. This program was implemented by the *Deutsche Gesellschaft für Technische Zusammenarbeit* (GTZ, now GIZ) and funded and commissioned by the European Union (GTZ, 2007). AYUPER consists of several organisations which were contracted by the GTZ. Pachamama Raymi (Pachamama for short) is one of these organisations which were selected for AYUPER (Pachamama Raymi¹, 2009; GTZ, 2007).

Pachamama is a non-governmental organization with several projects in mainly Peru. Its projects are based on the Pachamama Raymi methodology (section 2.2), which promotes collective commitment and the development of local capacities by organizing contests with several themes, such as pasture management. During these contests "expert" farmers or communities introduce their innovations and contestants are encouraged to adopt and adapt the different innovations which were shown by the experts (Van Immerzeel, 2006). Usually a project of Pachamama Raymi lasts three or four years. However, the project with AYUPER has only lasted 12 months. Therefore it is interesting to investigate the efficiency of this short-post disaster project. When short-post disaster projects are as efficient as longer projects money and time can be saved.

In this thesis report Pachamama Raymi's project with AYUPER in the province of Yauyos will be evaluated. This evaluation is commissioned by Pachamama Raymi's director Willem van Immerzeel and will consist of (1) farmers' opinions on the project and (2) an investigation of the diffusion of innovations after project retreat. Therefore the current state of innovations needs to be indicated. Special attention is paid to innovations with a high rate of discontinuance since these are the innovations with room for improvement. Reasons for discontinuance will be mapped and placed in context (3). Reasons for discontinuance will be mapped by indicating named reasons for discontinuance by farmers in the field and by investigating correlations between the unsuccessful innovations and different variables by means of a SPSS analysis. Finally, (4) found results for Yauyos will be compared to the second short post-disaster project of Pachamama Raymi in Valle Sagrado which was conducted between July 2010 and May 2011. This comparison is done in order to indicate general patterns in this type of projects.

Data was collected during two evaluation rounds between February 23th and March 17th 2012 in both Yauyos and Valle Sagrado. Both projects are comparable in length and implementation. In order to assess the farmers' opinion on the project, data collected by the previous evaluation round in Yauyos is used for comparison over time (section 3.3.2)

In this report, firstly, the theory of the diffusion of innovations and the Pachamama Raymi methodology will be explained. After the theoretical frameworks, background information on the projects and previous evaluations is provided. After all general information the research is explained in the methodology, followed by the results derived from analysis. In the discussion the results for Yauyos are reviewed and compared to the results found for Valle Sagrado. After the conclusion, recommendations are given for further research.

The report is initially meant for the Pachamama Raymi Organisation and organisations who implement the Pachamama Raymi methodology as well. This research will also be suitable for individuals who are interested in the diffusion of innovations in rural areas or short development projects. This report does not provide any information on long term projects nor compares short post-disaster projects to long term projects.

2. Concepts & Theories

In this section the focus will be on two theoretical concepts, namely the diffusion of innovations and the Pachamama Raymi methodology as these are inseparable from the implantation of innovations by the Pachamama Raymi organisation. *The diffusion of innovations* can be seen as the overarching concept with many related sub-concepts. Research on the diffusion of innovations started during the 1940s and 1950s and has its roots in the agricultural sector (Rogers, 2003). In the course of the years research has broadened and now relates to many scientific disciplines from anthropology to public health.

The Pachamama Raymi methodology modifies the ways to diffuse innovations in order to increase the speed of diffusion. Pachamama's main adjustment is to use the knowledge of the farmers as a starting point. The best practices in the region are promoted and farmers are encouraged to adapt the innovations to make them suitable for their own situation.

2.1 Diffusion of innovations

This section consists of a summary of E.M. Rogers' research on diffusion of innovations. All the information is derived from his book *The diffusion of innovations* (2003).

According to Rogers, *diffusion* is "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5).

Diffusion consists of four elements: (1) the innovation itself, (2) the communication through which it is passed from one to another, (3) the time it takes to pass the innovation between individuals or a social system and (4) the social system in which the innovation diffused.

(1) An *innovation* is "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12). Innovations have different characteristics which influence the perception of the potential users towards the innovation:

1. *Relative advantage*: People only choose to change if it is beneficial. The relative advance is therefore the degree to which an innovation is perceived as better than its alternatives. The larger the relative advantage the larger the chance of adoption.
2. *Compatibility* is the extent to which an innovation is in line with existing values, experiences and needs of the potential adopters. The more an innovation is in line with an adopters' (social) environment and beliefs, the larger the possibility that an innovation will be adopted.
3. *Complexity* is the extent to which an innovation is seen as difficult to use and understand. The more complex the innovation, the more likely an innovation will not be adopted
4. *Triability* is the ease to try the innovation on a limited basis before adopting it. People tend to be risk avoidant and therefore prefer to try an innovation before adopting. Innovations which are easy to try on a limited base are more likely to be adopted.
5. *Observability*: If an innovation is viewable and people see that an innovation works well for other people, they are more likely to adopt the innovation. It also stimulates peer discussion about the innovation with friends and neighbours and other people who already adopted the innovation.

(2) *Communication channels* have an important role in the diffusion of innovations. Messages such as information about innovations spread from one individual to another through these channels.

Rogers claims that diffusion research shows that most people depend more on subjective information about an innovation from other individuals who have already adopted the innovations than from mass media. Furthermore, communication between similar individuals is likely to be more effective as individuals tend to communicate with individuals who are similar in, for example, beliefs, education or status. However, this homophily slows down the diffusion of innovations within a social system, as the innovation stays within the homophilous group. Heterophily, interpersonal communication between people who are different, accelerates diffusion. Consequently homophilous communication increases the chances of adoption between *individuals*, however heterophilous communication increases diffusion within a *social system*.

(3) *Time* in a diffusion process refers to three notions: the innovation decision process, innovativeness and the rate of adoption.

The *innovation decision process* consists of five stages. First an individual learns about the existence of an innovation and collects information about it; secondly the individual forms an attitude towards the innovation. This can be either favourable or unfavourable. Thirdly, he makes a decision to implement the innovation or not. When he chooses to use the innovation, he will bring this in practice. During this implementation phase re-inventing is possible: the adopter adapts an innovation to his own particular situation. High possibilities for re-inventing increase the chance of adoption. Confirmation is the final stage, where the implementation will be approved or disapproved. Disapproving will lead to discontinuance.

The time it takes to pass through all these stages is called the *innovation decision period*.

Innovativeness, as Rogers defines in his work is “the degree to which an individual or other unit of adoption is relatively earlier in adopting net ideas than the other members of a system” (Rogers, 2003, pp. 22). Based on this innovativeness, five adopter categories can be defined: (1) innovators, (2) early adopters, (3) early majority, (4) late majority and (5) laggards. Here, Innovators are the first to adopt an innovation and the laggards the last. The adopter categorisation can be illustrated as a normal frequency distribution as seen in Figure1.

The *adoption rate* is defined as the “relative speed with which an innovation is adopted by the members of a social system” (Rogers, 2003, p. 221). Where the innovation decision process and innovativeness are related to the individual, the adoption rate is related to the social system as a whole. This rate of adoption is measured by the time required for a certain percentage of the population to adopt an innovation. When 100% of the system adopts the innovation, the rate of adoption usually has an S-shaped rate of adoption (Figure 1). Primarily, the small group of innovators adopts the innovation, followed by the early adopters and others. The diffusion will be completed when the small group of laggards adopt the innovation. When enough individuals adopted the innovation, the critical mass is reached. This means that the diffusion of this innovation becomes self sustainable. This whole process of diffusion can take several years to complete and depends on the names factors.

The final factor of a diffusion process is the *social system*. As Rogers states, a social system is “defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members of these units within a social system may be individuals, informal groups, organisations or subsystems” (Rogers, 2003, p. 37). The social structure influences the diffusion of an innovation in several ways. Social systems consist of groups consisting of homophilous individuals. Innovations will diffuse through some of these groups first before diffusing to other groups. The structure of these sets and their communication structures influence the speed of diffusion. Norms also affect the diffusion of innovation since the norms are related to compatibility. Finally opinion leaders and change agents also influence diffusion. *Opinion leaders* are individuals with a large influence on other individuals’ behaviour. The opinion leaders serve as a role model for the innovation behaviour of their followers.

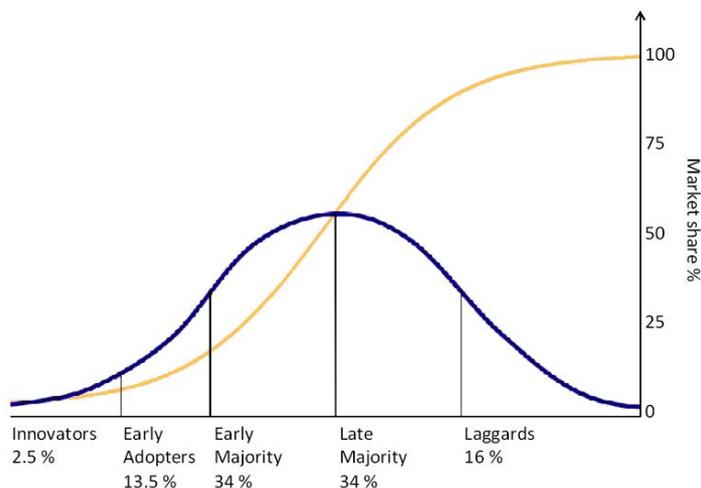


Figure 1: different adopter categories as a normal frequency distribution and the adoption rate represented as the s-curve (Tungsten, 2009).

A *Change agent* is “an individual who influences clients’ innovation decisions in a direction deemed desirable by a change agency” (Rogers, 2003, p.27). These change agents usually are professionals with high education and social status. Unfortunately this top-down transfer of knowledge leads to heterophily with their clients. To solve this problem many change agencies also hire *aides*. These are less than fully professional change agents and are usually more homophilous with their clients. Therefore the aide will not be seen as an expert by the client; however their credibility is higher than with a change agent. Due to the homophily with the clients, he is perceived by them as more trustworthy.

2.2 Pachamama Raymi Methodology

The initial design for the Pachamama Raymi methodology (Pachamama for short) was developed in 1986 for the rural development organisation PRODERM. This organisation was looking for ways to improve field irrigation systems. Willem van Immerzeel came up with the idea to implement the innovations by organizing contests. The idea was based on the Dutch ploughing contests. Over the years several changes were applied to improve the methodology, though there will always be room for further improvement. This section is based on Van Immerzeel's book *Poverty, How to accelerate Change* (2006)

Pachamama originates from an area with a strong cultural identity which has its roots in old cultures such as the Inca culture. Van Immerzeel (2006) notes that the farmers’ perspective differs from the organisations’ western perspective and thus a large heterophily between the change agent and client exists. Pachamama tries to reduce heterophily by creating *transcultural bridges*. Elements from the different cultures are combined. This is accomplished by, for example, using expressions from Quechua (Pachamama Raymi is Quechua for “feast of mother earth”), by anticipating on existing rituals or holidays and by involving local institutions.

Due to the difference in cultural backgrounds of the change agent and client, organisations must not try to just implement innovations which are perceived as the right ones by the organisation, but build on the existing knowledge and know-how of farmers. This is also described as the *cognitive approach* where existing knowledge and know-how is the starting point for capacity development. Capacity development “is the process through which individuals and their organisations acquire and develop knowledge, know-how and skills, which translates in possessing new capacities” (Van Immerzeel 2006, p. 90). By building on the existing knowledge and know-how, compatibility (section 2.1) increases and therefore the chance of adoption of new practices.

Projects using Pachamama apply the concept of *cooperative competition*. Contests aiming at improving existing practices are organized, where families who manage their resources better than others will be rewarded with prizes (usually cash money) and social recognition. The contests, prizes and social recognition function as motivators for people to start using innovations (Van Immerzeel 2006). During these contests people share their knowledge and know-how by peer-learning. “Expert” farmers show other farmers how they, for example, manage their land. However, according to Van Immerzeel (2006), just transferring the knowledge of the expert farmer is not enough.

Innovations need to be adapted to the personal situation of contestants. Each contestant needs to modify innovations in order to make it work optimal in their situation. Actually, we cannot speak of the *best practice*, only of the best practice for a certain situation. Hence, it is important to notice that Pachamama Raymi uses sets of similar practices in order to give farmers a broad range of possible practices which they could use or adapt. Knowledge of different practices is not only important for choosing the most suitable innovation during the contests but also for choosing the most suitable practice in a changing environment. This is called *adaptive management*: people adjust their management strategies to cope with change (Van Immerzeel, 2006).

The idea of expert farmers and communities is derived from the concept *Learning from the best*. Change is accelerated from the inside by finding the ones with the best practices. This is only a very small group within a social system. With learning from the best, Pachamama Raymi amplifies this small percentage of people with the best practice in such a way that the best practice becomes the normal standard. However there will always be people who adapted the new innovations better and these become the new experts (Figure 2). In this way people keep improving. (Van Immerzeel, 2006).

Note the differences between *Learning from the best* and Rogers: Pachamama Raymi modifies diffusion in such a way, that the group of early adopters increases to 60% instead of Rogers' 13.5% (figure 1). The gradual increase of the adoption of innovations as described by Rogers is avoided by using contests.

Amplification of the best practices is achieved with use of contests which have a high rate of participation. Pachamama Raymi calculated that the critical mass (section 2.1) is around 30% (Van Immerzeel 2006). Furthermore, Pachamama Raymi anticipated a decline in use of 30% per innovation as well. Therefore the amount of participants in a contest needs to be as high as possible with a minimum participation around 60% of the population.

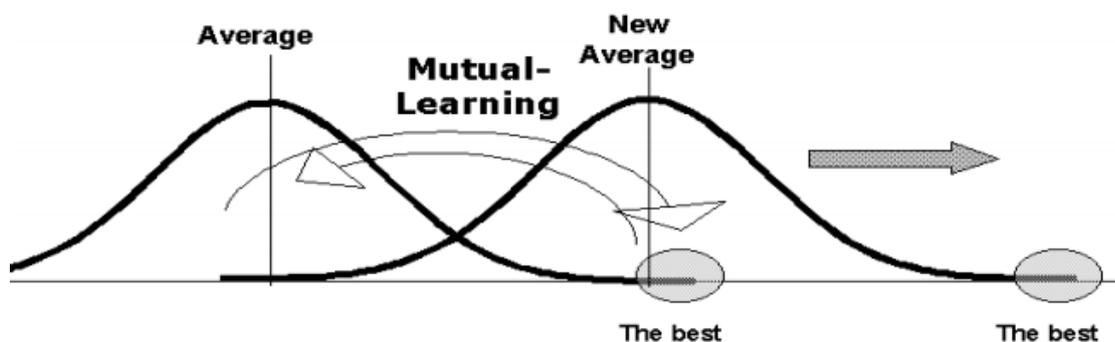


Figure 2: learning from the best (source: Van Immerzeel, 2006)

3. Background

3.1 Pachamama Raymi Organisation: *learning from the best* in practice

The Pachamama Raymi Organisation was founded in 2006 by Willem van Immerzeel. Over the years he developed more ideas for implementing the Pachamama Raymi methodology, but since he worked for other projects, he never had the freedom to fully implement the methodology and had to combine it with conventional methodologies. Thus, the Pachamama organisation is based on the Pachamama Raymi methodology only (Van Immerzeel, 2006). One of these ideas was to implement many innovations at one time. According to Van Immerzeel eradicating poverty was not only about improving the economic situation of the farmer but also about improving health, education and reclamation of degraded natural resources (Pachamama Raymi², 2009). In order to speed up change, innovations concerning these different elements should be implemented at the same time and not one at a time. Another important idea of Van Immerzeel was using a field staff which consisted of farmers only instead staff with minimum academic requirements (Pachamama Raymi², 2009). This would decrease the resistance to change since this staff has more credibility and are more homophileous with the clients and thus is more efficient (see section 2.1).

The Pachamama contest consists of six themes in which farmers participate, namely: living, health, business, livestock, forestation and Irrigation, crops and pastures. In the *Rules and regulations (original title: Bases del concurso, 2009)*, every one of these themes contains of several criteria which vary per project as every project area is different. Since Pachamama Raymi does not implement one innovation to tackle a problem but uses sets of similar practices, the *Rules and Regulations (2009)* provide general guidelines rather than exact step for step procedures.

An example is the building of stables. The contests' rules and regulations do not include details about how to build a stable. People learn about different ways how they can build stables in the field and have to use this knowledge to build their own stalls. The one who is the most successful in applying the knowledge to their situation wins. Farmers are evaluated several times during the contest. For every theme they get between 0 and 10 points for each practice. In the end, the one with the highest amount of point wins the contest. Some themes require special attention and have separate prices. (Bases del concurso, 2009)

Since the projects of Pachamama Raymi have a broad range of innovations, only eleven innovations are selected for evaluation in this thesis report. Remember that these are not always specific innovations but more a collective noun for a set of different practices with the same goal, such as the stables The innovations were selected for their importance for people and environment or for their high discontinuance (section 4). Especially innovations with a high discontinuance will be examined (section 5 and 6).

The following eleven innovations were chosen. Most of them are self explanatory, but for more information the rules and regulations (2009) provide additional info.

1. Improved stove (improvement: smoke is leaded outside by a pipe)
2. Stables for animals
3. Vaccination of animals
4. producing dairy products (e.g. cheese, yoghurt)
5. Production of onions on a commercial scale
6. Biol (fertilizer, made of a mix of different plants)
7. Vegetable garden
8. Nursery for seedlings (seedlings will be used for plantations or for fruit production)
9. Management of plantations
10. Recovery of degrades pastures and stripped areas (e.g. planting grass)
11. Rotation of pastures.

3.2 Research areas

3.2.1 Yauyos

Yauyos is a remote province in the district of Lima at an altitude of 3300 – 3400 m which is similar to Cusco's altitude (Jordan², 2012). The nearest city is Cañete, with is a four hour drive from the southern part Yauyos. Yauyos' capital is Yauyos and lies in the northern part of the province. The total number of families in Yauyos according to Pachamama's annual report (2010) consists of 1685 families. Nearly all families are to some extent engaged in agricultural activity and are in this report perceived as farmers.

Yauyos can be divided in a northern, central and southern region. The southern part is the largest in area and population size, yet it is also the poorest and most remote area of Yauyos (Jordan², 2012). Roads are not well maintained and got worse during the heavy rainfall in February, 2012. The central zone has many possibilities such as fruit production. The northern zone has mining and tourism as resources. In this zone is also a large activity of development organisations such as IDMA, which implements similar innovations as Pachamama Raymi. (Jordan¹, 2012)

For the evaluation, questionnaires were completed in 17 communities and villages all over the province (section 4.1). Although the communities were often not larger than 30 families, in villages with a central function housed 60 to 80 families. For a detailed map of Yauyos view Appendix 1. According to the annual report (2010), 61% percent of the population participated in the contests.

From information derived from the questionnaire it can be concluded that agriculture is an important source of income; 30.6% of the interviewees stated that they have no other source of income. Agricultural products are mostly sold; 63.5 % of the interviewed people sell a part of their production, included 14.1% of persons who sell more than 75% of their products. 35.3% of the persons use their products for their own consumption and 1.2% did not answer this question.

Beside agriculture, trade (28,2%) and day labour (24,7%) are the most important sources of income for the inhabitants of Yauyos. 44.7% of the farmers answered that less than 1/3 part of their income comes from agriculture where other interviewees (also 44.7%) claimed that more than 2/3 of their income is derived from agriculture. 9.4% answered that the agricultural part of their income lies between 1/3 and 2/3 part and 1.2% did not answer the question.

On average, a farmer has 1.5 hectares of farmland, but there are large deviances. Some farmers stated that they have more than 20 hectares of farmland. Next to their farmland, farmers also make use of communal pastures. Most farmers produce potato and own cattle which they let graze on the higher situated pastures.

3.2.2 Valle Sagrado

Valle Sagrado, or Sacred Valley in English, is an hour drive from Cusco and is popular by tourists because of the large amount of historical remains from the Inca culture and the route to the famous Machu Picchu. This kind of tourism is limited to only one side of the Urubamba river though, namely the side on which the main road lies. Not only Spanish is spoken in Valle Sagrado, but also Quechua, a language which originates from the Incas. Especially elder people tend to speak Quechua instead of Spanish. Valle Sagrado has a warm climate and its altitude is around 2900 m (Google Earth², 2012).

The evaluation was conducted in seven communities on the non touristic side of the Urubamba river (see section 4.1 and Appendix 2). The communities in Valle Sagrado are larger than communities in Yauyos; the communities consisted of 40-80 families with two exceptions. The seven communities consist of 301 families.

According to collected data, 73% percent participated in the projects' contests (Pachamama Raymi⁴, 2010). Similar to Yauyos, agriculture is the main source of income. 63.8% of the interviewed farmers said that agriculture is their only source of income. Beside agriculture day labour is an important source of income (15.9%). Of the farmers, 79.7% sell part of their production, including the 18.8% of farmers who sell more than 75% of their products and 20.3% of the farmers use their products for own consumption. 23.2% of the farmers stated that their agricultural activities provide less than 1/3 of their income, 56.5% said that their complete income consisted of agricultural activities. Note that people who use all of their products for own consumption are included since their income can be seen as their own food. Generally a farmer in Valle Sagrado has 1,1 hectare of farmland. Contrary to Yauyos here are no large deviances in size. Corn is the most produced crop in Valle Sagrado, just as in Yauyos cattle graze on the higher pastures.

In 2010 Valle Sagrado got affected by heavy rain and flooding of the Urubamba river. After this disaster Pachamama Raymi started a post disaster project financed by the Cusco Chamber of Commerce, in order to help the affected population. This project took place between July 2010 and May 2011. This project was more intensive than the project in Yauyos. (Jordan², 2012)

3.3 Previous evaluations

The First evaluation of the project in Yauyos was conducted in July and August 2010, shortly after the project ended. Enrique Nolte evaluated not only Pachamama's part in the AYUPER project, but AYUPER as a whole in all the provinces (Nolte, 2010). Since 158 questionnaires were filled in the whole project area (Yauyos, Castrovirreyna and Huaytara) it is difficult to get a good view on Pachamama's contribution in the project. Therefore Nolte's results will not be used for comparison.

Shortly after the first evaluation, Jasper van der Woude conducted the second evaluation between September and December 2010 (Van der Woude, 2010). During this evaluation 148 questionnaires were completed for Yauyos. Although Van der Woude focussed his research on pasture management, general questions from Nolte's questionnaire were included as well. Since there are only a few similarities in the used questionnaires, recent data will only be compared with Van der Woude's results on opinions of farmers concerning project quality and project effects.

Van der Woude (2010) found the following results which can be used for a comparison:

1) People were asked to give the Pachamama project a mark between zero and twenty. The average mark given to the project was a 15.0

2) Participants in the evaluation were asked about improvements thanks to Pachamama Raymi. They had to confirm whether the effects named in the questionnaire applied for them or not. As displayed in figure 3, this gave the following results:

more production: 77.2% confirmed

more money: 26.2% confirmed

better health: 86.9% confirmed

better house: 94.5% confirmed

better future: 64.8% confirmed

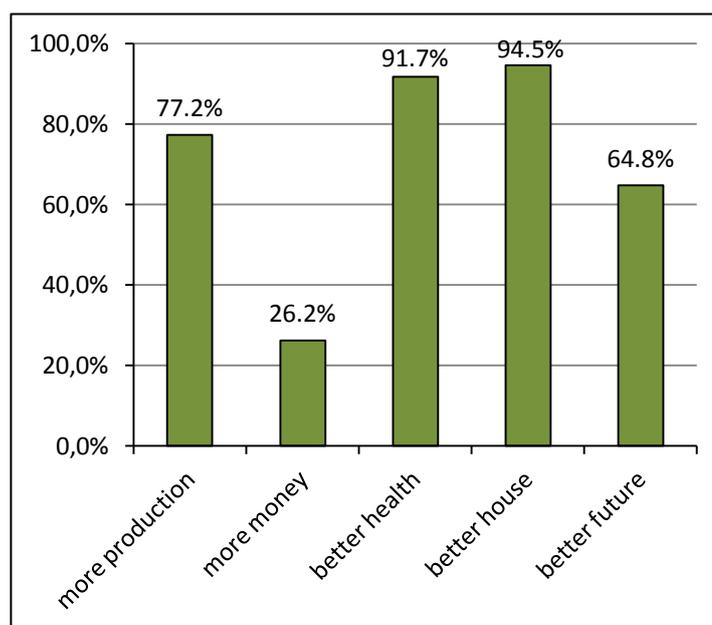


Figure 3: Project effects according to farmers in Yauyos 2010

4. Methodology

4.1 Collecting of data

As said, data was collected by using a questionnaire in two different areas; Valle Sagrado and Yauyos. The used sampling method was an accidental sampling method, where people on the field or street were interviewed. If people were not in public spaces, people were interviewed at home.

Different questionnaires were used in Valle Sagrado and Yauyos, as the questionnaire was improved and adapted after the first evaluation round in Valle Sagrado. Both questionnaires can be found in appendix 3 (Valle Sagrado) and appendix 4 (Yauyos). Note that the questionnaires in the annex are translated to English. The originals were in Spanish, the principal language of Peru.

Both questionnaires can be divided in five parts: “general information”, “participation during contest”, “Innovation use” (which innovation, (dis)continuance, reasons for discontinuance etc.), “non-participation” and “agriculture related questions” (questions about rotation, with which frequency biol is used etc.). The questionnaires for the two research areas differ in lay out (Yauyos is more compact and organized) and number of innovations. For Yauyos more innovations were selected than for Valle Sagrado. Another change is the addition of the question whether people used innovations before the project or not.

The 26 communities in Yauyos where Pachamama Raymi was active consisted of 1685 families. Seventeen communities were visited for this research over a period of three weeks. The visited communities differ in size and area (section 3.2). In appendix 1 a map of Yauyos is given with the visited communities. In total 85 questionnaires were completed, which is 5.0% of the total number of families. In general, more questionnaires were completed in larger communities in order to get a balanced data set. Most questionnaires were thus conducted in the southern part of Yauyos since this area has the highest population and hardly any development organisations are active in the area. In the northern part few questionnaires were performed as one of the active development organisations (IDMA) implements innovations which are similar to those of Pachamama Raymi (Jordan¹, 2012). Therefore it is difficult to indicate whether innovations are continued thanks to Pachamama Raymi or IDMA. This can lead to corrupted data.

Field work was conducted with the help of an employee of Pachamama Raymi, Jorge Jordan, who worked in Yauyos during AYUPER. With his help, the current state of innovations was indicated. With these observations a balanced assessment of the results can be made (Section 6).

Since the Project Area in Valle Sagrado consists of seven communities only, all communities have been visited. The questionnaire in Valle Sagrado lasted one week thanks to the easy accessibility and small size of this area. In Appendix 2 a map of the Valle Sagrado can be found. In total 69 questionnaires were completed, which is 23% of the families which consists of 301 families. Similar to Yauyos the aim was to keep the percentage of people interviewed more or less equal for every community. In contrary to Yauyos Valle Sagrado is more homogenous and thus the percentages were more equally divided. Since many people in Valle Sagrado prefer to speak Quechua instead of Spanish, field work was conducted with the help of a translator who worked for Pachamama Raymi. No observations regarding innovation quality were done as this idea came after the evaluation round in Valle Sagrado.

4.2 Data Analysis

The analysis consisted of two main parts: data processing in Excel and data processing in SPSS.

Three types of data were derived from Excel:

1. General data such as the percentages of different possible answers on product use, average land surface etc. (see section 3.2).
2. Data for comparison with Van der Woude's evaluation (see section 8.1). Since Van der Woude only used percentages in his research, comparison can only be done by calculating percentages for comparison of the effects of Pachamama Raymi. People had to indicate what they perceived as positive effects of Pachamama Raymi. These results will be used in the evaluation as it indicates the effectiveness of the project.
3. The adoption rates and diffusion after project retreat were derived from the dataset in Excel as well. The adoption rate was calculated by the difference in percentage between use before the project and current use of innovations. Note that this report does not strictly follow Rogers definition of adoption rate, as Rogers assumes that the diffusion starts at 0% and the rate of adoption indicates how much time it takes for a population to reach a certain percentage of adoption. Since the innovations discussed in this report, are often used in some way before the Pachamama Project it is impossible to indicate at what point of time people started with an innovation. Therefore the use before the contest is used as the starting point since people adopted new ways to implement a practice when the project started. It is assumed that the use of innovations before the project is the same at the moment the project started.

The adoption rate gives an indication of the success of Pachamama Raymi in general, but since Pachamama Raymi implemented new practices it is also necessary to look at the diffusion of these innovations after project retreat. By indicating the diffusion of innovations after project retreat a more nuanced view can be given on the practices. This is required as Pachamama Raymi aims at high participation rates in the contest and assumes that after project retreat there will be a decline of use, followed by a gradual increase due to "natural" diffusion. Therefore it is interesting to see to what extent the use of these innovations in- or decreases. This diffusion of innovations after project retreat is calculated by the difference in the percentage of people who indicated that they started and the people who indicated that they discontinued with the innovation.

SPSS was used for investigating relationships between different variables and continuance, discontinuance or adoption of unsuccessful innovations. Since the aim of investigating relations between variables was to find influencing factors, a broad scale of variables has been researched. An unsuccessful innovation was defined as an innovation with a negative growth. Thus the discontinuance is higher than the adoption.

For both research area correlations were explored however, since less questionnaires were done in Valle Sagrado than in Yauyos, the Chi square analysis was not possible for Valle Sagrado.

Two SPSS functions were used for deriving the relations: the Pearson correlation and the Chi-square.

The Pearson correlation is used for factors with a scale value. These are continual variables like the amount of farmland or age. The continual variables can be correlated with other continual variables but also with categorical variables. Beside significance, also a correlation coefficient is given which indicates the strength and the direction of the relation (De Vocht, 2010).

The relation is read from Pearson's R, which indicates the strength of the relation. According to De Vocht (2010) there is no relation between $R=0$ and $R=0.25$, a weak relation between $R=0.25$ and $R=0.50$, between $R=0.50$ and $R=0.75$ there is a moderate relation and for $R=0.75$ or higher there is a strong relation. With an R of 1 there is complete consistency. In this research a two more categories are added in order to get a more nuanced view: weak-moderate ($R=0.35 - R=0.50$) and moderate-strong ($R=0.65 - R=0.75$).

Extreme values were left out of the Pearson correlation as these extremes can influence the found correlation. For farmland all values of 6 or higher are left out. This is 9.4% of the Yauyos dataset (missing values not included in calculation) and 1.45% of the Valle Sagrado dataset. For terrace surface all values of 3 or higher were left out (Yauyos=3.8%, Valle Sagrado=0%) and for pasture surface all values of 4 or higher (Yauyos= 6.5%, Valle Sagrado=0%).

In this research the Pearson correlation was used to correlate the continuance, stopping and starting of innovations with the factors (1) age, (2) amount of farmland, (3) terrace surface, (4) pasture area, (5) amount of people living in the house, (6) the amount of animals, (7) the amount of cows.

Factors 1 and 2 were used as a base and the other factors were used to investigate whether these factors 1 and 2 were the only influencing factors. For example: the amount of farmland might influence the use of dairy products, however it is more likely that the amount of cows is the main influence for the use of dairy products.

The Chi-square is a function which calculates whether there is a relation or not based in the cells in a cross table. The Spearman correlation was not used since the Spearman correlation is used to correlate two categorical variables that consist of more than two categories (De Vocht, 2010). The variables for starting, stopping and continuance of innovations consist of only yes or no answers.

According to De Vocht (2010), a condition for a valid chi-square is that three or all cells of a cross table must consists of values higher than the expected value with a minimum of 5. Where this is not the case, a chi-square is calculated but the use of it is not valid and as such these results cannot be used. The chi-square was used to explore relationships between continuance, stopping and starting with innovations with the factors (1) Product use, (2) education, (3) the percentage of income which is derived from agricultural activities.

5. Results

This chapter will focus on the research results. For both Yauyos and Valle Sagrado the interviewees' perception on the project and project effect will be given. Secondly the actual state of innovations will be displayed. In this section the adoption rate and diffusion of innovation use after the project retreat are displayed. Here, the unsuccessful innovations are indicated as well. Finally the SPSS results will be presented. Note that these results will focus on the unsuccessful innovations only. Results concerning general information about the research areas (e.g. product use) can be found in section 3.2.

5.1 Yauyos

5.1.1 People's perception on project quality

Interviewed persons were asked whether their life improved thanks to Pachamama Raymi. Figure 4 shows that 62.4% of the people thought that their life improved regularly to a lot thanks to Pachamama Raymi.

Secondly people were asked to indicate the effects on their life thanks to Pachamama Raymi; multiple choices were possible. Figure 5 shows the percentages of people who indicated that a certain aspect applied to them. It can be seen that "more production" (48.6%) and "better future" (44.6%) applied for most of the interviewees, where more money and more sales (both 16.2%) were less seen results. 13.5% of the interviewees indicated other effects such as a cleaner environment.

Finally, people were also asked to give the project a mark between 0 and 20. The average mark given by interviewed people in Yauyos was a 17.

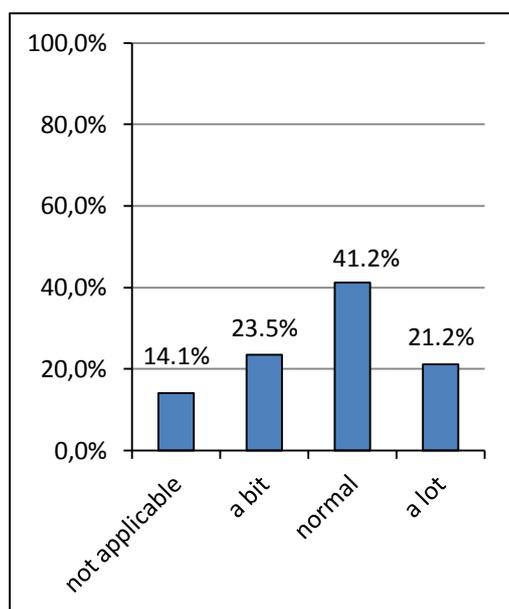


Figure 4: improved life according to interviewees in Yauyos

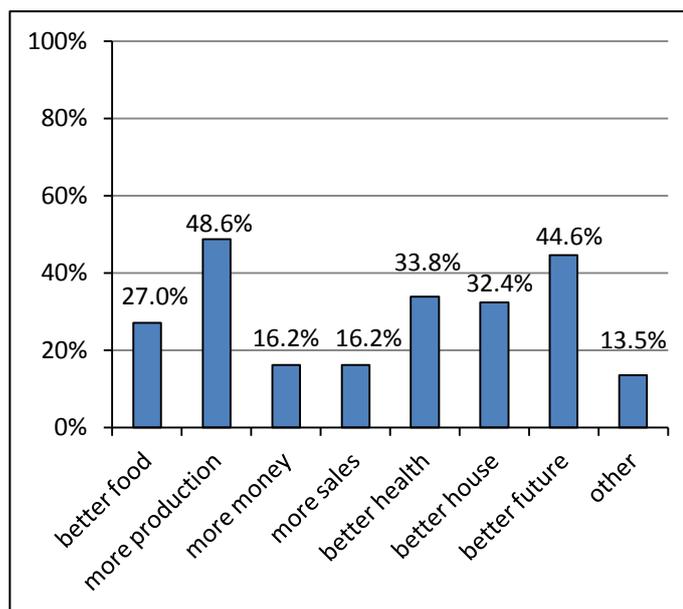


Figure 5: project's effects according to interviewees in Yauyos

5.1.1 Actual state of innovations

In de questionnaire people were asked about their use of innovations. The interviewee had to indicate if they (1) used an innovation before the Pachamama Project, (2) Adopted an innovation during one or both of the Pachamama contests, (3) started using an innovation after the contest (thus never used before as well) and (4) continued or (5) discontinued with the innovation. Table 1 shows the amount (count) and percentages of confirming answers given in the questionnaire. Note that due to practical reasons, this table shows only part of the answers. The complete table including participation rates for each contest can be found in Appendix 5.

The adoption rate was calculated in the following way: %Continuance - %Before. The calculated difference is the increase or decrease of innovation use since the project start. The diffusion after project retreat is calculated by %Started after contest - %Stopped after contest. "Started after contest" and "stopped after contest" are the number of people who indicated in the questionnaire that they started or stopped with an innovation after the contest. By calculating the difference, the increase or decrease in innovation use after the Pachamama Raymi project is calculated.

As can be seen in Table 1, all innovations were used before Pachamama Raymi. Vaccination of animals (69.4%), pasture rotation (56.5%) and producing dairy products (51.8%) were the most used innovations before the Pachamama Project. Stables for animals (1.2%) and biol (2.4%) were hardly used before the project start.

Continuance is still high among most innovations and as can be seen in the "adoption rate" column in all cases the adoption rates are positive. Especially the improved stove and introduction of onions have high adoption rates with adoption rates of respectively 56.5% and 41.2%. Lowest adoption rates are found for Vaccination of animals (7.1%) and producing dairy products (4.7%). When looking at the diffusion of the innovations after project retreat there is a decrease of use for all innovations except for two. There is an increase of use of stables (1.2%) and pasture rotation remains stable. Highest decreases can be found for onions (-31.8%) and biol (-30.6%). Other innovations with a high decrease of innovations use are producing dairy products with a decrease of 17.6%, seedling nursery (-12.9%) and vegetable garden (-11.8%).

Table 1: Innovation use Yauyos

Nr.	Innovation	Before		Continuance		Adoption rate		Started after contest		Stopped after contest		Difference contest-now	
		count	%	count	%	count	%	count	%	count	%	count	%
1	Improved stove	18	21.2%	66	77.6%	48	56.5%	5	5.9%	7	8.2%	-2	-2.3%
2	Stables for animals	1	1.2%	15	17.6%	14	16.5%	2	2.4%	1	1.2%	1	1.2%
3	Vaccination of animals	59	69.4%	65	76.5%	6	7.1%	0	0.0%	3	3.5%	-3	-3.5%
4	Producing dairy products	44	51.8%	48	56.5%	4	4.7%	0	0.0%	15	17.6%	-15	-17.6%
5	Onions	13	15.3%	44	51.8%	31	36.5%	2	2.4%	29	34.1%	-27	-31.7%
6	Biol	2	2.4%	21	24.7%	19	22.4%	0	0.0%	26	30.6%	-26	-30.6%
7	Vegetable garden	27	31.8%	62	72.9%	35	41.2%	3	3.5%	13	15.3%	-10	-11.8%
8	Seedling nursery	6	7.1%	27	31.8%	21	24.7%	0	0.0%	11	12.9%	-11	-12.9%
9	Management of plantations	21	24.7%	52	61.2%	31	36.5%	2	2.4%	4	4.7%	-2	-2.3%
10	Recovery of stripped pastures	14	16.5%	32	37.6%	18	21.2%	0	0.0%	3	3.5%	-3	-3.5%
11	Pasture rotation	48	56.5%	63	74.1%	15	17.6%	0	0.0%	0	0.0%	0	0%

5.1.3 Correlations

This sections' focus is on correlations between the innovations and different variables. As mentioned in the Methodology (4.2), two different analyses were done: Pearson correlation and Chi square. Only innovations with high discontinuance (for Yauyos more than -10%) are used. For Yauyos these are "producing dairy products", "onions", "biol", "vegetable garden" and "seedling nursery".

Pearson:

Table 2 shows correlations found with use of the Pearson correlation. As can be seen in the column "Aspect", not only the actual use of innovations (continuance) is analysed, but also use before Pachamama Raymi, discontinuance and starting with innovations after the project.

Only four weak positive relations were found. A positive relations implies that the higher the value of the variable, the higher the continuance, discontinuance or starting with an innovation (depending on the aspect). A negative relation suggests that for example the higher the age of a person the lower the continuance with seedlings. Mention that relations with a Pearson's R lower than 0.250 are not considered as a valid relation. The strongest relations found was between producing dairy products before the project and pasture surface, followed by a relation between use of vegetable garden before Pachamama Raymi and terrace surface and the relation between continuance of the vegetable garden and Pasture surface. The final relation is the relation between producing dairy products before Pachamama Raymi and the amount of farmland.

Table 2: Pearson Correlations found for Yauyos

1. Age - innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Seedlings	Continue	0,033	-0,235	0,05	No
2	Garden	Continue	0,098	-0,183	0,1	No
3	Seedlings	Stop	0,094	-0,185	0,1	No
2. Farmland - innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Before	0,030	0,253	0,05	Weak
2	Garden	Continue	0,049	0,230	0,05	No
3. Terrace surface - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Stop	0,029	0,249	0,05	No
2	Garden	Before	0,006	0,313	0,05	Weak
3	Biol	Continue	0,080	0,201	0,10	No
4. Pasture surface - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Before	0,006	0,315	0,05	Weak
2	Garden	Continue	0,021	0,265	0,05	Weak
3	Garden	Stop	0,036	-0,242	0,05	No
5. Nr. Animals - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Continue	0,089	0,206	0,10	No
2	Onion	Stop	0,079	0,213	0,10	No
3	Seedlings	Continue	0,079	0,213	0,10	No
6. Nr. Cows - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Continue	0,035	0,243	0,05	No
7. Nr. People in House - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	Continue	0,036	0,230	0,05	No

Chi-square:

With the Chi-square relations are calculated with use of cross tables. The strength of a relation can be indicated with Cramer's V. Determining the strength of the relation with Cramer's V is similar to Pearson's R, thus the same categories of strength apply. However, Cramer's V does not indicate negative or positive relations and therefore only the strength of the relation can be verified. Table 3 shows the found significant relations.

Only one moderate relation can be seen in table 3. This is the relation between the continuance of the production of dairy products and the production of dairy products before the project. No relations were found between any of the innovations and Education. Between product use and onions, two weak relations were found: continuance of onions ($V= 0.265$) and discontinuance of onions ($V= 0.335$). Again note that there is no indication of negative or positive directions in Cramer's V.

Only one relation was found between the "percentage of income derived from agriculture" and "use of the garden" before the Pachamama Raymi Project ($V= 0.271$). Most relations were found between the use of innovations before the contest and the continuance in these innovations.

Table 3: Chi-square relations for Yauyos

1. Education						
nr	innovation	Aspect	α	Sig.	Cramer's V	relation
0	0	0	0	0	0	0
2. Product use						
nr	innovation	Aspect	α	Sig.	Cramer's V	Relation
1	Onions	cont.	0.052	0.100	0.265	Weak
2	onions	stop	0.009	0.050	0.335	Weak
3. Percentage of income derived from agriculture						
nr	innovation	Aspect	α	Sig.	Cramer's V	Relation
1	onions	cont.	0.097	0.100	0.236	No
2	garden	antes	0.046	0.050	0.271	Weak
3	seedlings	cont.	0.095	0.100	0.237	No
4. Before						
nr	innovation	Aspect	α	Sig.	Cramer's V	Relation
1	products	cont.	0.000	0.050	0.625	Moderate
2	Biol	cont.	0.012	0.050	0.271	Weak
3	garden	cont.	0.024	0.050	0.245	Weak
4	seedlings	cont.	0.005	0.050	0.305	Weak

5.2 Valle Sagrado

5.2.2 People's perception on project quality

Equal to Yauyos, people in Valle Sagrado were asked to indicate the results of the Pachamama Raymi project. Figure 7 shows for every effect the percentages of people who indicated that aspect applied to them. Most participants confirmed the positive effects of the project. "better food" (98.4%) applied for nearly all questioned people while "more sales" (76.2%) was least perceived as applying. 14.3% indicated other effects such as a cleaner environment. People were also asked to give the Pachamama Raymi project a grade between 0 and 20. The average grade given by questioned people in Valle Sagrado was 18. Finally people were asked whether their life improved thanks to Pachamama Raymi. The results are shown in Figure 6. According to 65.2% of the interviewees life improved a lot.

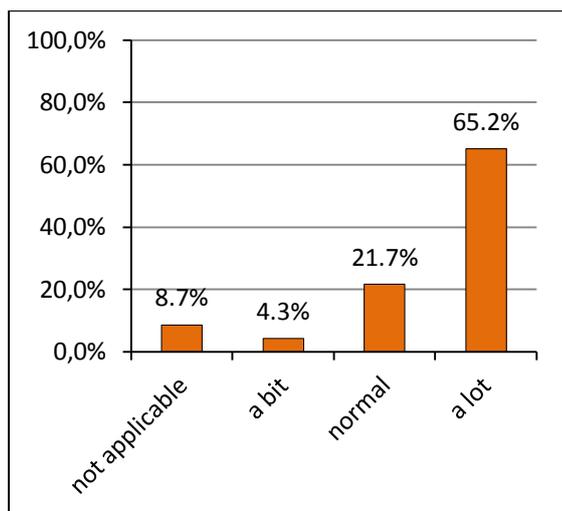


Figure 6: Improved life according to interviewees Valle Sagrado

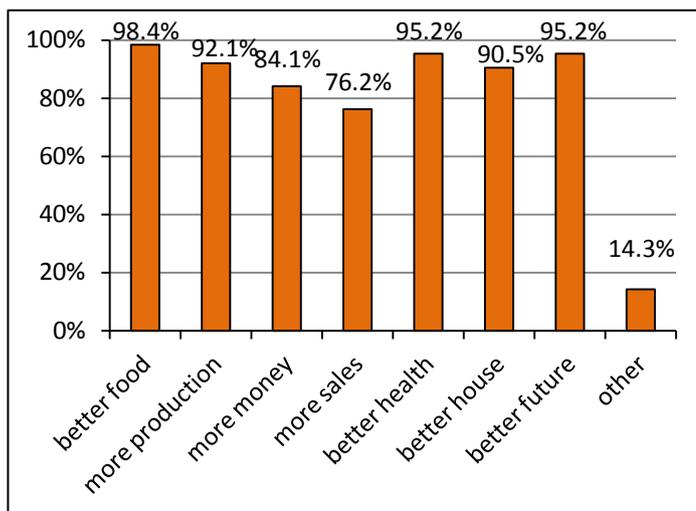


Figure 7: Project's effects according to farmers in Valle Sagrado

5.2.1 Actual state of innovations

Table 4 shows the number and percentages of the confirming answers given in the questionnaire. The same explanation is applicable as for table 1 in section 5.1.1. Again note that due to practical reasons, this table shows only part of the answers. The complete table including participation rates for each contest can be found in Appendix 8. The use of innovations before Pachamama Raymi was not included in the questionnaire used in Valle Sagrado and as such the adoption rate could not be calculated. Only differences in actual use and use during the contests were calculated.

As can be seen in Table 4 continuance is still high for most innovations. However, only in some cases an increase of use after project retreat can be seen. The highest increase can be seen for the stables for animals with an increase of 8.7%. Overall, onions were the least successful innovation with a decrease in use of 7.2%. Other innovations with a negative adoption rate are biol (-4.3%), vegetable garden (-2.9%) and the seedling nursery (-2.9%). Most discontinuance can be seen for biol (10.1%), onions (7.2%) and the vegetable garden (7.2%). Although biol had the highest discontinuance, it also had the second highest starting percentage. 5.8% of the interviewed people started with Biol. The innovation with the highest amount of starters is "Stables for animals" with a percentage of 8.7%.

Table 4: Innovation use Valle Sagrado

Nr.	Innovation	Continuance		Started		Stopped		Difference contest - now	
		count	%	count	%	count	%	count	%
1	Improved stove	60	87.0%	0	0.0%	0	0.0%	0	0.0%
2	Stables for animals	45	65.2%	6	8.7%	0	0.0%	6	8.7%
3	Vaccination of animals	59	85.5%	3	4.3%	1	1.4%	2	2.9%
4	Producing products	17	24.6%	0	0.0%	0	0.0%	0	0.0%
5	Onions	53	76.8%	0	0.0%	5	7.2%	-5	-7.2%
6	Biol	47	68.1%	4	5.8%	7	10.1%	-3	-4.3%
7	Vegetable garden	52	75.4%	3	4.3%	5	7.2%	-2	-2.9%
8	Seedling nursery	21	30.4%	0	0.0%	2	2.9%	-2	-2.9%
9	Management of plantations	54	78.3%	2	2.9%	0	0.0%	2	2.9%
10	Recovery of stripped pastures	44	63.8%	0	0.0%	0	0.0%	0	0.0%
11	Pasture rotation	55	79.7%	0	0.0%	0	0.0%	0	0.0%

5.2.3 Correlations

Similar to section 5.1.3, this section presents the results for the SPSS analysis. However, a Chi-square analysis is not included in this section since no valid relations were found due to lack of data. In order to calculate reliable results, each cell of the cross table needed an amount of unit or 5 or higher. This was not possible with the limited amount of questionnaires conducted in Valle Sagrado (Section 4.2).

Table 5 shows correlations found for Valle Sagrado with the Pearson correlation. The explanation of the table is equal to the explanation of table 3 in section 5.1.3

As can be seen in the table, most relations found, are weak positive relations. All negative relations can be found in the correlations with "Age"; Age correlates with stopping with onions (R= -0.261) and starting with biol (R= -0.267). Beside the negative relations two positive innovation were found for the relation between number of animals and production of dairy products and the relation between the number of cows and the production of dairy products. No significant weak relations or higher were found between any innovation and the variables "farmland surface", "terrace surface", "pasture surface" and "amount of people in the house".

Table 5: Pearson correlations for Valle Sagrado

1. Age - innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Onions	stop	0,032	-0,261	0,05	Weak
2	Biol	start	0,028	-0,267	0,05	Weak
3	Seedlings	stop	0,051	-0,238	0,10	no
2. Farmland - innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
0	0	0	0	0	0	No
3. Terrace surface - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Seedlings	cont.	0,097	0,205	0,10	No
4. Pasture surface - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
0	0	0	0	0	0	No
5. Nr. Animals - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	cont.	0,007	0,337	0,05	Weak
6. Nr. Cows - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Products	cont.	0,052	0,280	0,10	Weak
2	Onions	cont.	0,089	0,246	0,10	No
3	Garden	cont.	0,091	0,244	0,10	No
7. Nr. People in House - Innovation						
Nr	Innovation	Aspect	α	Pearson's R	Sig.	Relation
1	Garden	cont.	0,067	0,223	0,10	No

6. Discussion

Now actual use of innovations, opinions of farmers and correlations are presented, these results need to be combined and interpreted with a focus on Yauyos in order to create a coherent whole. First the found results on the people's perception on the project will be interpreted, after this the found results on the innovations will be discussed and explained with found correlations and background information. After discussing the results within Yauyos, results of Valle Sagrado will be reviewed and compared to the findings in Yauyos. Finally this chapter will be concluded with outlining the reliability of this research.

6.1 Yauyos

When Figure 3 (evaluation 2010) and Figure 5 (evaluation 2012) are combined to Figure 8, differences over time can easily be seen. Over time farmers confirmed less effects as applicable to them. The largest declines in percentages over time can be seen in health (-57.9%) and housing (-62.1%). The effect "more money" is in both evaluations the effect with the lowest percentage of people who perceive this effect as applying to them. For the effects "better food", "more sales" and "other", only the results of Yauyos are displayed as these effects were not included during the evaluation in 2010.

An explanation for the decline in perceived effects can be the time passed between project retreat and the evaluations. Van der Woude's evaluation was conducted a few months after project retreat where the evaluation of 2012 was conducted 21 months after project retreat. Another possible explanation lies in the observation of project quality. According to observations during the evaluation round in Yauyos it was noted that the quality of the innovations had declined. It is presumed that the declining quality of the projects causes a more negative view on project's results as the effectiveness of innovations decreases with quality. Interesting to see is that the mark given to Pachamama Raymi increased. Where people gave Pachamama Raymi a note of 15 in 2010, interviewees rated Pachamama Raymi with 17 in 2012. The cause of this increase might be that people gained a better understanding of the influence on their life thanks to the innovations. The fact that people first asked if Pachamama Raymi intended to return to Yauyos and therefore gave higher ratings might have been of influence as well (see Reliability). To conclude this section it must be noted that people in general were very content with Pachamama Raymi and all interviewees wished for Pachamama Raymi to return. This can also be concluded from the result on the question whether the interviewees life improved as more than 50% of the interviewees confirmed that their life improved on a normal (41.2%) or high (21.2%) base.

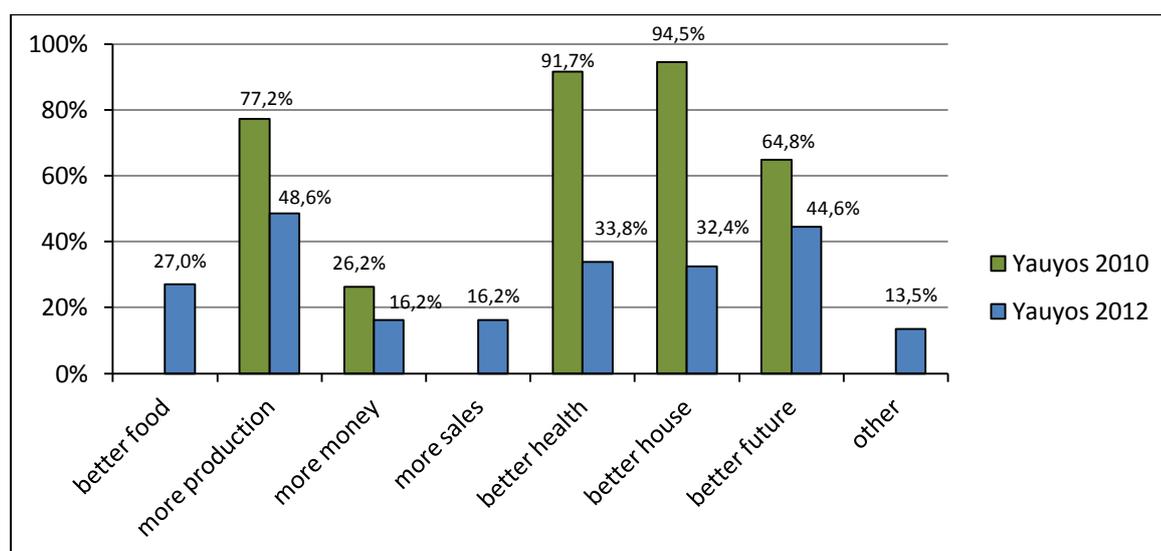


Figure 8: Project's effects Yauyos 2010-2012 compared

As mentioned in the results, the continuance of the different innovations is still high and the adoption rate is for all innovations positive. This means that Pachamama Raymi succeeded in spreading innovations as more people are using the different innovations after the project retreat than before. Pachamama Raymi especially accelerated adoption when it comes to innovations as the improved stove (+56.5%), vegetable garden (+41.2%) and onion cropping and management of plantations (both +36.5%). Less change could be seen for production of dairy products and vaccination of animals, however these two innovations had already a high use before Pachamama Raymi (respectively 51.8% and 69.4%).

When focussed on the diffusion of innovations after the project retreat it can be seen that all innovations but two decreased in use. The production of dairy products, onion cropping, biol, vegetable garden and the seedling nursery were the most unsuccessful innovations when looking at the diffusion after the project as these five innovations showed a discontinuance rate of more than 10%. Note that despite their high decline in use after project retreat, onion cropping and the vegetable garden still have one of the four highest adoption rates as the adoption rate is the increase of use since before the project start.

Pachamama Raymi already assumed that there would be declines in use up to 30% (section 2.2), however it is useful to assess unsuccessful innovations after project retreat in order to make future projects more effective. Therefore the five most unsuccessful innovations named above will be further investigated by using background information, named reasons for discontinuance by farmers and correlations found in SPSS.

Onion cropping (decline: 31.7%)

An often heard reason to terminate the production of onions was lack of seed. Yauyos is a four hour drive away from the nearest city Cañete, which makes it difficult to get seed. Some farmers also stated that they terminated onion cropping for selling, but still produce onions only on a very small scale (e.g. not more than a square meter). Other reasons to stop were lack of time, no motivation, no harvest or farmers neglected the cropping of onions. Beside these reasons for not continuing in onions, a Chi-square relation was found between product use and discontinuance of onions. This is a weak relation of $V=0.335$. despite the fact that Chi-square does not indicate whether the relation is negative or positive it can be concluded that most farmers who stopped with onions are farmers who use their food for own consumption (Appendix 7.1 for cross table). Other relations found had a correlation coefficient which was too low for a valid relation.

Biol (decline: 30.6%)

The remoteness of Yauyos also seems to be related to the discontinuance of biol, where farmers often indicated that they did not have enough materials for the production of biol. Another often named reason for discontinuance is the lack of time. Several interviewed farmers stated that they work a lot and thus no time is left for the production of biol. Other reasons were no motivation, poor results and neglecting the production of biol.

As biol is a new practice to most people in Yauyos (only two interviewees used biol before the project), it is assumed that people terminate biol for the reason that they do not know the innovation well. Here compatibility (section 2.1) plays an important role as biol might not be in line with the environment of the user whereby the user develops a lack of motivation for further use. In the central area of Yauyos there is another external reason for discontinuance: one of the active development organisations in this area, Senasa, introduces similar innovations and thus people exchanged biol for Senasa's innovations (Jordan¹, 2012). The only relation found for biol was between current and previous use of biol, however as only two farmers indicated that they used biol before the Pachamama Raymi project this result is not representative.

Production of dairy products (decline: 17.6%)

For the production of dairy products, shortage of materials is a returning problem. Especially the lack of enough milk seems to be a problem according to several interviewees. Many farmers (61.3%) in Yauyos have less than ten cows and not all cows produce enough milk for the production of dairy products. Other reasons were the complexity of the production process and lack of time.

Positive Pearson relations were found between the use of innovations before the project and farmland and pasture surface however, between continuance and the amount of cows hardly any relation ($R= 0,243$) was found. This might indicate that farmers with cows grazing on larger pastures produce more milk products than farmers with cows on a small field thanks to having more fodder. This would explain why the area of pastures is of more importance than the number of cows. Also there is a Chi-square relation found for use before and current use of the practice. However from the cross table cannot be derived whether this is a positive or negative relation

Seedling nursery (decline: 12.9%)

Lack of seed is, equal to onion cropping, the main reason for discontinuance within seedling nurseries. Furthermore a relation was found between continuance with the seedling nursery and use of the seedling nursery before the project. As indicated from the cross table (appendix 7.2) people who used the innovation before the Pachamama project are more likely to continue. This would mean that most of the discontinuance is found in the group of users who started the innovation during the Pachamama Raymi project. However this correlation is a weak relation.

Vegetable garden (decline: 11.8%)

Lack of time and interest are the main reasons for farmers to neglect and stop the vegetable garden. It is presumed that the relevant advantage of the innovation influences the decision making process. People might perceive the advantages of the vegetable garden as low because the vegetable garden is something personal and does not bring in money. Therefore people tend to stop with their vegetable garden and spent that time on money generating practices.

This presumption is ratified by the found relation between previous use and percentage of income derived from agriculture. According to the cross table (appendix 7.3), most people who owned a vegetable garden before the Pachamama Raymi project, derive more than 75% of their income from agriculture (63% of the interviewees). Farmers who use their products for own consumption are included in this category as well since it was assumed that, in a way, their income consists of food instead of money. Thus to farmers who use their products for own consumption, a vegetable garden might have more relative advantage since they do not make money from their agricultural practices. Therefore varied food from the vegetable garden increases in value. Other relations found, consisted of a positive relation between previous use and terrace surface, a positive relation between continuance of the vegetable garden and pasture surface and a relation between previous use and continuance. It can be concluded that the more land surface (terraces or pastures) the more use of the vegetable garden there will be. It is assumed that the relative advantage of a vegetable garden also increases when a farmer owns more land since it is easier to save a part of the area for a vegetable garden.

In general most relations were found for the relation between the use of an innovation and use of the same innovation before Pachamama Raymi. The relations found between previous en current innovation use are explained with the use of compatibility. People are familiar with the innovations and will not stop easily after project retreat. It must be noted that during the evaluation round, it was seen that there is a high continuance in innovations, however the quality of the innovations deteriorated. Farmers tend to fall back to their old habits. Again, this can be explained with compatibility as farms prefer to go back to the old familiar ways.

6.2 Comparison with Valle Sagrado

Interviewees in Valle Sagrado were more positive when it comes to Pachamama Raymi. Their average grade given to Pachamama Raymi was an 18 and nearly all named effects were perceived as applying by more than 90% of the interviewees. As displayed in figure 9 this is different from Yauyos where none of the named effects were perceived as applying by more than 50% of the interviewed farmers. Of the interviewees, 65.2% stated that their life improved a lot thanks to the project. This is 44% more than in Yauyos. These large differences are probably caused by the difference in time after project retreat and the intensity of the project in Valle Sagrado (see also section 3.2.2). Not only is the time between project retreat and evaluation shorter in Valle Sagrado (only 8 months), but the project was more intense as well.

Similar to Yauyos, every interviewed farmer wished for the return of Pachamama Raymi.

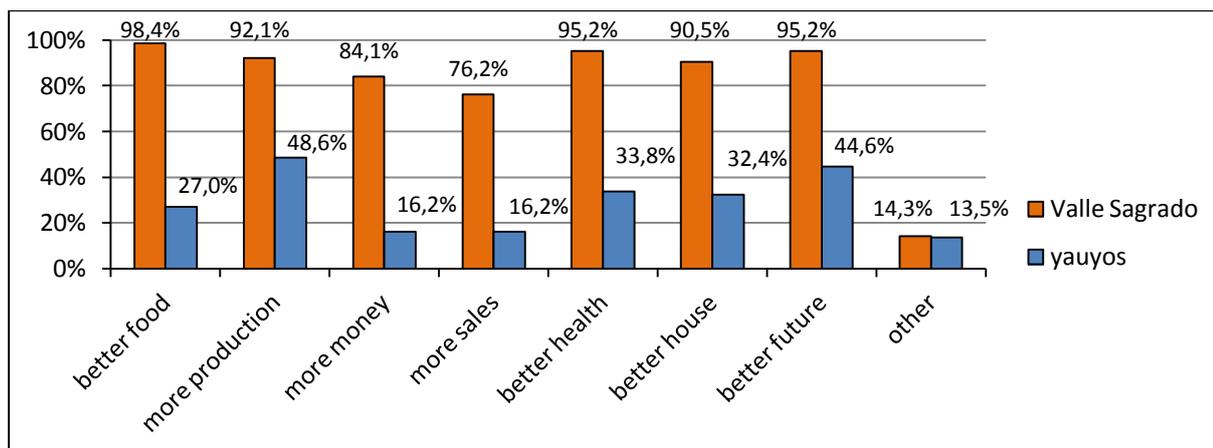


Figure 9: Project's effects Valle Sagrado - Yauyos compared

High participation rates can be seen in both research areas (Appendix 5 and 6), although Yauyos had slightly lower adoption rates. Yauyos had a participation of 53.8% on average whereas Valle Sagrado had an average participation of 64.9%. Current use remains high in both areas. In Yauyos a small decrease in overall use is seen when compared to use during the contests (-0.9%) while current use in Valle Sagrado increased with 1.9%.

Large differences in use are observed within use of stables for animals: In Yauyos 17.6% uses stables, while 65.2% of the interviewees indicated that they have stables. This can also be seen for biol and recovery of pastures. Biol is used by 24.7% of the interviewed farmers in Yauyos as 68.1% uses biol in Valle Sagrado; for recovery of pastures it is observed that 37.6% of the farmers in Yauyos stated that they practice this innovation, where 63.8% of the farmers in Valle Sagrado stated that they recover pastures. Only one innovation was more practiced in Yauyos than Valle Sagrado: the production of dairy products. A possible explanation is that cattle stock in Yauyos is larger than in Valle Sagrado. Where in Valle Sagrado corn is the main source of income, people in Yauyos use their cattle as main source of income. Dairy products are sold in Cañete.

The diffusion process in Yauyos is more advanced when compared to Valle Sagrado. Both adoption and discontinuance rates are more extreme in Yauyos than Valle Sagrado, however due to the higher discontinuance rates in Yauyos only one innovation showed an increased use after project retreat. In Valle Sagrado discontinuance rates are lower so more innovations stay stable or show an increase in use. These differences in diffusion are explained by the time passed between project retreat and the present evaluation. The evaluation was done 21 months after project retreat in Yauyos and 8 months in Valle Sagrado. Therefore farmers in Yauyos had more time to indicate whether innovations are useful to them or not as it takes time to see the effects of different innovations.

The difference in discontinuance could be caused by impatience of farmers in Yauyos. Perhaps it took too much time to see the benefits of different innovations and therefore the farmer terminated the innovations too soon. The lack of immediate effects negatively influences the relative advantage of the innovation as perceived by the farmer. The intensiveness of the project in Valle Sagrado could have caused lower discontinuance in Valle Sagrado as well since people learned more about innovations during the project than people in Yauyos

A similarity can be seen in unsuccessful innovations; in both areas onion cropping, use of biol, the vegetable garden and the seedling nursery showed a decrease in use. However where all of the named innovations in Yauyos show discontinuance rates of more than ten percent, discontinuance rates in Valle Sagrado stay below ten percent. Figure 10 shows the rates of discontinuance of the most unsuccessful innovations in both areas. Production of dairy products in Valle Sagrado showed neither increase nor decrease, but was included in the figure as this practice showed a high decrease in Yauyos.

One of the least successful innovations in both research areas is the cropping of onions. Lack of seed, however, does not seem to be a problem in Valle Sagrado since it is close to Cusco. Lack of time and poor harvest are the most named reasons of interviewees to stop this practice. Remarkable is the negative relation between the discontinuance of onion cropping and age in Valle Sagrado. Thus the higher the age of a farmer, the larger the rate of continuance is.

Shortage of time is, similar to onions, the most named reason to stop biol in Valle Sagrado. Beside lack of time, lack of materials was the second most important reason to stop. According to the found relationships, there is a negative relation between starting with biol and age. Again, the presumption is that compatibility has a large influence in the adoption and continuance of these innovations. In both project areas this innovation was unknown to the area.

Finally lack of time is also an often named reason for the discontinuance of the vegetable garden in Valle Sagrado. Shortage of space is perceived as the main reason to stop with seedling nurseries.

It has to be noted that since only few people stopped with innovations in Valle Sagrado, it is not clear whether these named reasons are the actual reasons for discontinuance.

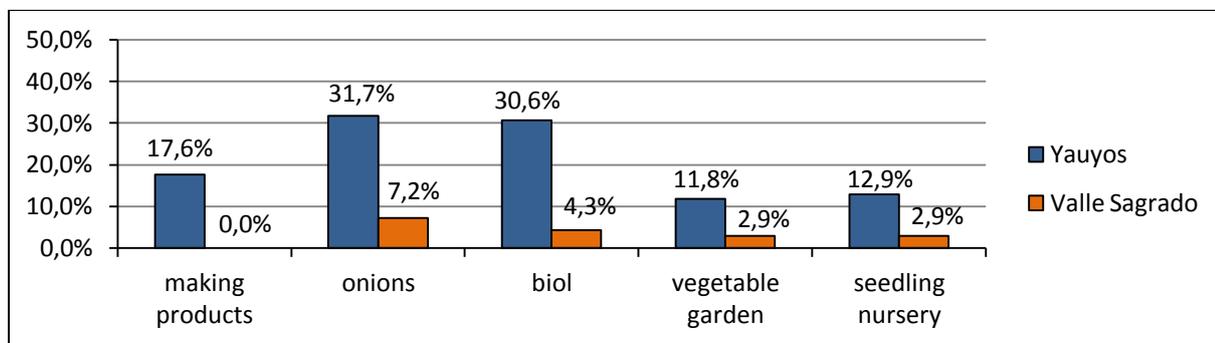


Figure 10: discontinuance rates of the most unsuccessful innovations

6.3 Reliability

The reliability of the research can be reviewed by dividing the research in three categories: the questionnaire itself, fieldwork in which the questionnaire was conducted and the analysis of the results.

The questionnaire can be improved on two main points. Firstly, the intention was to compare results of the interviewees with their ratings during the contests. Would discontinuance occur often among people with poor ratings during the projects? However due to lack of time this analysis was left out of the research. Nevertheless, interviewees' names were asked during the questionnaire and the fact that people were not anonymous could have influenced the results. People tend to give more positive answers when they feel that other people (e.g. project staff) can see which one of the interviewees gave negative answers. Secondly, two different questionnaires were used.

The questions asked in the questionnaire were equal in general, only the lay out was changed. Furthermore several innovations were added for the second innovation in Yauyos on behalf of the Pachamama Raymi organisation. The adding of “use before Pachamama Raymi” was the only important change for the research. First it was intended to calculate the adoption rate by calculating the difference in contest participation and continuance, however after further research it was decided to use “use before the contests” instead of contest participation (see section 4.2). Therefore the adoption rate could not be calculated for the Valle Sagrado.

Fieldwork also influenced the reliability of the results. Firstly a smaller fraction of people was interviewed in Yauyos. Only 5% of the total population was interviewed for this research, while 23% of the population in Valle Sagrado was interviewed. This low percentage of completed questionnaires had two causes: (1) farmers often went to their pastures early in the morning, thus only few people were present in the villages and (2) the evaluation in Yauyos lasted only two weeks. Since Yauyos is a very large area relatively less people were covered in a two week evaluation than in Valle Sagrado where the population consists of only 300 families. The sample taken with interviews might not be completely random, as many farmers already left for their pastures.

The interviewers themselves might also have affected the answers given during the evaluation. The author is a white foreign woman with only a basic understanding of Spanish and her colleagues were Peruvian male representatives of the Pachamama organisation. The author would have an advantage when interviewing female interviewees, however the credibility of a foreigner might be perceived lower than of Peruvian women. Both colleagues worked in one of the research areas thus people often knew them personally. Being a representative from Pachamama Raymi could cause more positive answers as people often asked on forehand if Pachamama intended to return to Yauyos. Interviewees might believe that more positive answers might cause Pachamama’s return to Yauyos.

In Valle Sagrado, the accompanying colleague also was the translator, since most people spoke Quechua in Valle Sagrado. Misinterpretations could occur or extra information could be missed during the translation as long answers of farmers often were translated into one or two sentences.

Only in Yauyos the quality of innovations was reviewed. As the author never went to the area before and during the project it was difficult to estimate the quality of the innovations. With help of the accompanying colleague who worked during the project it was indicated that the quality of the practiced innovations declined. Also note that Pachamama Raymi intended the implemented sets of innovations to be changed over time. It was difficult to see whether an innovation was wrongly adapted or neglected.

Finally, the colleague stayed in Yauyos one week longer than the author to fill in more questionnaires in the Central and Northern part of Yauyos. This could have lead to differences in answers since now there was only the representative of Pachamama Raymi without the foreign woman.

The analysis of the derived data influences reliability mostly when it comes to the SPSS analysis. The main influence is the answer distribution. When there are for example only two farmers who discontinued with an innovation the reliability of found relations declined. In the case of the Chi square the analysis cannot be used since only one cell is allowed to contain a value of value of less than five for a reliable chi square. Especially for Valle Sagrado this was a returning problem as fewer interviews were conducted in Valle Sagrado. Only the Pearson correlation could be used.

Another difficulty of the analysis was that the innovations should be seen as a dynamic set of different practices which can be adapted over time. Therefore reliability of the adoption rate is not accurate since the practiced of the farmers before the Pachamama Raymi project were not the exact practices as implemented by Pachamama Raymi.

7. Conclusions

This thesis report evaluates the short post-disaster project of the Pachamama Raymi organisation in Yauyos which was executed between April 2009 and June 2010. The project follows the Pachamama Raymi methodology which implements innovations by means of contests and the concept of learning from the best. The evaluation consists of the following aspects: assessment of (1) farmers' opinions on the project and (2) the current state of innovation use. Where there was high discontinuance, (3) reasons for discontinuance were investigated. Finally, (4) found results in Yauyos were compared to the second short post-disaster project of Pachamama Raymi in Valle Sagrado (conducted between July 2010 and May 2011) in order to indicate general patterns of the short past disaster project.

According to the farmers' opinions the Pachamama Raymi project in Yauyos was a success. All interviewees mentioned that they wish for Pachamama Raymi's return to Yauyos. Of the farmers 21.2% indicated that their life improved a lot thanks to Pachamama Raymi. When asked what effects of the project applied for them, the interviewees were less positive. None of the effects applied for more than 50% of the farmers. These rates are lower than the rates found during the evaluation in 2010. The Probable causes are the amount of time that passed since project retreat in 2010.

Compared to Yauyos the Pachamama Raymi project in Valle Sagrado was perceived more positively than in Yauyos since 65.2% of the farmers indicated that their life improved a lot. Contrary to Yauyos nearly all effects applied for more than 90% of the farmers in Valle Sagrado. The only two exceptions are more money and sales. These were also the effects which applied fewest to interviewees in Yauyos. The differences can also be explained by the time passed since the project retreat and the intensity of the learning process. A second factor could be the more intense the learning process during the project in Valle Sagrado.

It can be concluded that the opinion of farmers became less positive over time, however interviewees were still very enthusiastic about Pachamama Raymi and often asked if it would return.

When looking at the actual state of innovations in Yauyos it is seen that continuance rates are very high. Also adoption rates are positive for all eleven innovations and varying from 4.7% to 56.5%.

According to these adoption rates it can be concluded that in most cases, Pachamama Raymi succeeded in spreading different innovations or as put by the Pachamama Raymi organisation, accelerated change. The higher the adoption rate the more successful the implementation.

Nearly all innovations showed a decline of use after the project retreat, however Pachamama Raymi presumed there would be a decline in use of innovation of 30%. With this in mind, most of the innovations show a decline in use which is negligible.

The most severe declines were found for onion cropping (-31.8%), biol (-30.6%), production of dairy products (-17.6%), seedling nursery (12.9%) and the vegetable garden (-11.8%). The remoteness of Yauyos seems to be of influence as lack of seed and other materials were often heard reasons for discontinuance.

Relative advantage and compatibility are probably influencing the discontinuance in some innovations, especially Biol and the vegetable Garden. The production of dairy products is positively related to pasture size. The larger the pastures the more continuance there is. Onion cropping (-7.2%) and biol(-4.3%) were the least successful innovations in Valle Sagrado, where lack of time seemed to be the most important reason for discontinuance.

Discontinuance and adoption of innovations were more extreme in Yauyos than in Valle Sagrado. It can be stated that the diffusion in Yauyos is in a more advanced state. Again the time passed since project retreat is the most probable cause of the found differences.

Thus overall, the Pachamama Raymi project in Yauyos was a success. Farmers were positive about Pachamama Raymi's work and continuance is still high. Also the decline in use after project retreat stayed in all cases but one under the decline of 30% which was assumed by Pachamama Raymi. In most cases lack of materials seemed to be the reason for discontinuance in Yauyos. When looking at similarities between Valle Sagrado and Yauyos, the same innovations were the most unsuccessful, though for different reasons.

8. Recommendations for further research

First of all more evaluations are recommended in order to get a better view on the diffusion of innovations after project retreat. Not only short projects should be evaluated but also long term projects in order to compare effectiveness between these two types of projects. Also it is recommended that evaluations are done in the presence of a staff member who worked in the area during the project. In this way a balanced view can be given on the results since this staff member can easily notice differences in the quality of used innovations. A disadvantage of using staff members is that people tend to give more positive answers, hoping for the project to return. For each evaluation it would be best to interview as many people as possible in order to conduct a reliable SPSS analyses. For Yauyos and Vale Sagrado it was observed that some innovations were unsuccessful. Special attention should be paid to those innovations to see where there will be further decrease in use.

In Yauyos, lack of materials and seeds was an often named reason for discontinuance. As Yauyos is a remote area it is more difficult to supply the materials, however the supply of materials could be improved. Research should be done on ways to improve the supply of materials in order to decrease the disadvantage of the remote areas.

Concerning the participation rate in contests, it can be concluded that it is possible to lower the participation rate of 60%. However, this research is conducted less than two years after project retreat and does not include predict further decline. Again, the monitoring adoption rates by means of evaluations is necessary in order to confirm this preliminary conclusion.

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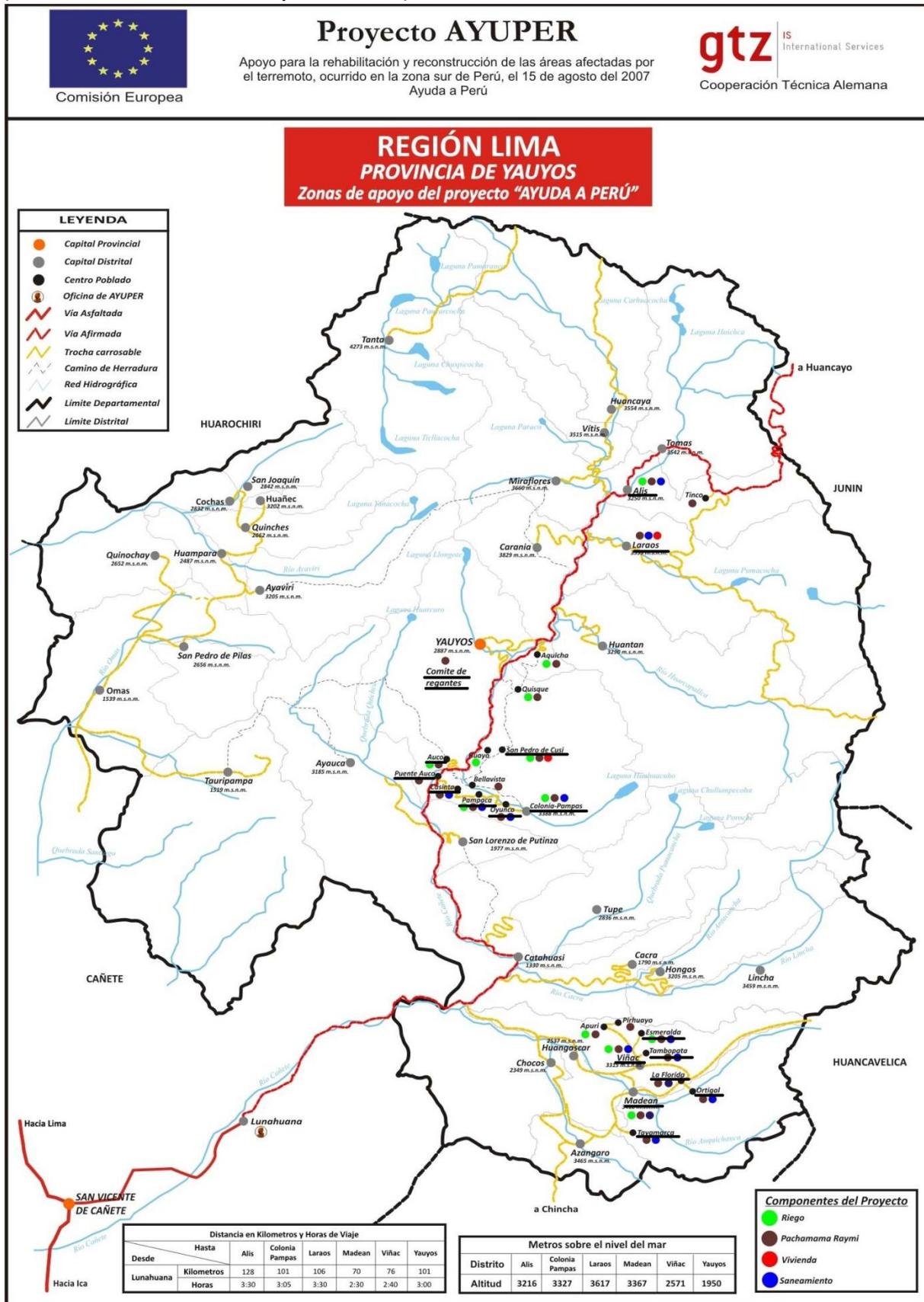
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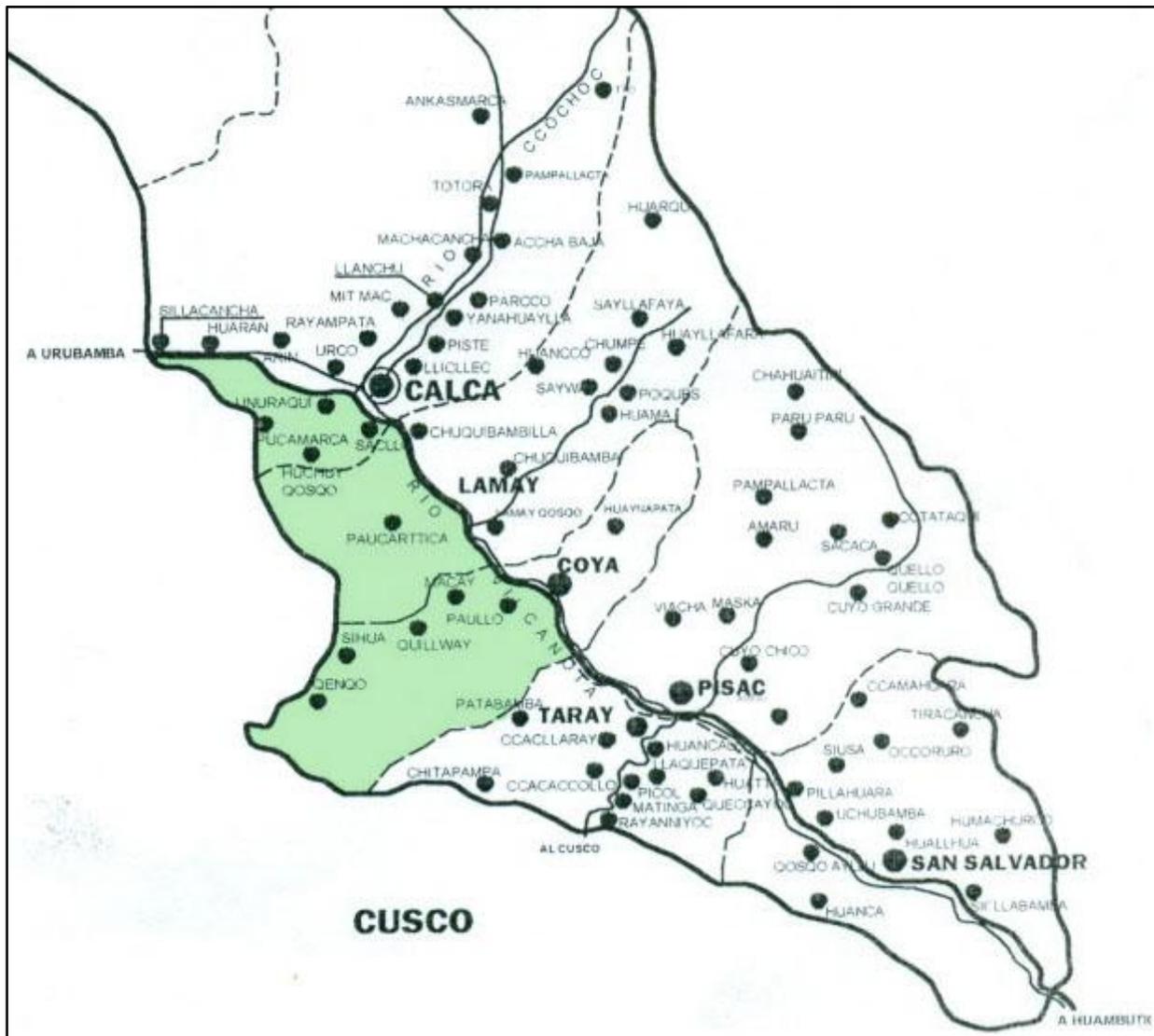
Appendix 1: Map of Yauyos

(source: Pachamama Raymi³, 2010)



Lined communities were visited during the evaluation round.

Appendix 2: Adjusted map of research area Valle Sagrado.
 (Source: Municipalidad Provincial de Calca, 2010)



Shaded area is research area.

Visited communities: Chimpacalca, Saclo, Huchuy Qosqo, Macay, Paullo Chico, Paullo Grande and Quilihuay

Appendix 3: Questionnaire used for Valle Sagrado (translated to English)

General information

01. Do you remember AYUPER? yes / no Do you remember Pachamama Raymi? yes / no
02. In which of the following did you participate?
Pachamama Raymi / Gestion del Agua/desague / Canales de Riego / Vivienda / Gestión del Riesgo
03. Name of community:
04. Your Name:
05. Age 06. Male / Female 07. Size of farm: m²/ha/topo
08. Do you own your land? No / Yes, a part of it / Yes, everything / It is from the community
09. Amount of persons living in your house? 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 or more
10. Amount of rooms in your house (including kitchen)? 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 or more
11. Your education: illiterate / primary / secondary / tecnico / university
12. Education of your children: illiterate / primary / secondary / technical / university
13. What do you do with products of your farm and cattle? consumption / selling a part / selling nearly everything
14. Do you have other sources of income? no / day labour / merchant / craftsman / other activities
15. What part of your income is provided by agriculture and cattle? less than 1/4 - 1/4 - 1/2 - 3/4 - + 3/4 - everything
16. Did you participate in Pachamama Raymi? yes / no (if not: continue to 28)
17. In with themes did you participate?
living / health / business / irrigation, cultivation, pastures / livestock / forestation
18. In how many contests did you participate? 1 / 2
19. How many months did you participate? 1-2 / 3-6 / 7-9 / 10-12
20. which innovation did you adopt during the contests?

Table 2

1	2	innovation	1	2	innovation
<i>Innovations concerning living, health, livestock and business</i>					
<input type="checkbox"/>	<input type="checkbox"/>	Improved stove	<input type="checkbox"/>	<input type="checkbox"/>	presentation of living area
<input type="checkbox"/>	<input type="checkbox"/>	Maintenance and use of bathroom	<input type="checkbox"/>	<input type="checkbox"/>	Order in living area
<input type="checkbox"/>	<input type="checkbox"/>	dump	<input type="checkbox"/>	<input type="checkbox"/>	Separate bedroom
<input type="checkbox"/>	<input type="checkbox"/>	Room for products (food)	<input type="checkbox"/>	<input type="checkbox"/>	Room for tools
<input type="checkbox"/>	<input type="checkbox"/>	Register animals	<input type="checkbox"/>	<input type="checkbox"/>	Vaccinate/medicate animals
<input type="checkbox"/>	<input type="checkbox"/>	Separating animals from living area	<input type="checkbox"/>	<input type="checkbox"/>	Making products (cheese, yogurt etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Stables for animals	<input type="checkbox"/>	<input type="checkbox"/>	other
<i>Innovations concerning irrigation, cultivation, pastures and forestation</i>					
<input type="checkbox"/>	<input type="checkbox"/>	Management of irrigation system	<input type="checkbox"/>	<input type="checkbox"/>	Forestation plan
<input type="checkbox"/>	<input type="checkbox"/>	Use of biol	<input type="checkbox"/>	<input type="checkbox"/>	Plantations
<input type="checkbox"/>	<input type="checkbox"/>	Use of biocide	<input type="checkbox"/>	<input type="checkbox"/>	Management of the plantations
<input type="checkbox"/>	<input type="checkbox"/>	Use of humus and compost	<input type="checkbox"/>	<input type="checkbox"/>	Variety of potatoes
<input type="checkbox"/>	<input type="checkbox"/>	Control of weeds and pests	<input type="checkbox"/>	<input type="checkbox"/>	Pasture plan
<input type="checkbox"/>	<input type="checkbox"/>	Organic vegetable garden and fruits	<input type="checkbox"/>	<input type="checkbox"/>	Ordering of pastures
<input type="checkbox"/>	<input type="checkbox"/>	Introduction of onions	<input type="checkbox"/>	<input type="checkbox"/>	Sowing of the pastures
<input type="checkbox"/>	<input type="checkbox"/>	Construction of terraces or andenes	<input type="checkbox"/>	<input type="checkbox"/>	Recovery of stripped areas
<input type="checkbox"/>	<input type="checkbox"/>	Restoration of terraces or andenes	<input type="checkbox"/>	<input type="checkbox"/>	Lasing animals or use of grazing fields
<input type="checkbox"/>	<input type="checkbox"/>	Management of a nursery	<input type="checkbox"/>	<input type="checkbox"/>	Rotation of the pastures
<input type="checkbox"/>	<input type="checkbox"/>	Variety of plants in nursery	<input type="checkbox"/>	<input type="checkbox"/>	other

21. do you continue with all innovations at this time? yes / no
If "no": with which innovation did you stop? (see table 2)

22. Did you change any of the innovations? yes / no
 If "yes:" which innovation did you change? (see table 2)
 Why did you change the innovation?

Table 3: for questions 21 and 22

Stop	change	Innovation	Stop	change	Innovation
<i>Innovations concerning living, health, livestock and business</i>					
<input type="checkbox"/>	<input type="checkbox"/>	Improved stove	<input type="checkbox"/>	<input type="checkbox"/>	presentation of living area
<input type="checkbox"/>	<input type="checkbox"/>	Maintenance and use of bathroom	<input type="checkbox"/>	<input type="checkbox"/>	Order in living area
<input type="checkbox"/>	<input type="checkbox"/>	dump	<input type="checkbox"/>	<input type="checkbox"/>	Separate bedroom
<input type="checkbox"/>	<input type="checkbox"/>	Room for products (food)	<input type="checkbox"/>	<input type="checkbox"/>	Room for tools
<input type="checkbox"/>	<input type="checkbox"/>	Register animals	<input type="checkbox"/>	<input type="checkbox"/>	Vaccinate/medicate animals
<input type="checkbox"/>	<input type="checkbox"/>	Separating animals from living area	<input type="checkbox"/>	<input type="checkbox"/>	Making products (cheese, yogurt etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Stables for animals	<input type="checkbox"/>	<input type="checkbox"/>	other
<i>Innovations concerning irrigation, cultivation, pastures and forestation</i>					
<input type="checkbox"/>	<input type="checkbox"/>	Management of irrigation system	<input type="checkbox"/>	<input type="checkbox"/>	Forestation plan
<input type="checkbox"/>	<input type="checkbox"/>	Use of biof	<input type="checkbox"/>	<input type="checkbox"/>	Plantations
<input type="checkbox"/>	<input type="checkbox"/>	Use of biocide	<input type="checkbox"/>	<input type="checkbox"/>	Management of the plantations
<input type="checkbox"/>	<input type="checkbox"/>	Use of humus and compost	<input type="checkbox"/>	<input type="checkbox"/>	Variety of potatoes
<input type="checkbox"/>	<input type="checkbox"/>	Control of weeds and pests	<input type="checkbox"/>	<input type="checkbox"/>	Pasture plan
<input type="checkbox"/>	<input type="checkbox"/>	Organic vegetable garden and fruits	<input type="checkbox"/>	<input type="checkbox"/>	Ordering of pastures
<input type="checkbox"/>	<input type="checkbox"/>	Introduction of onions	<input type="checkbox"/>	<input type="checkbox"/>	Sowing of the pastures
<input type="checkbox"/>	<input type="checkbox"/>	Construction of terraces or andenes	<input type="checkbox"/>	<input type="checkbox"/>	Recovery of stripped areas
<input type="checkbox"/>	<input type="checkbox"/>	Restoration of terraces or andenes	<input type="checkbox"/>	<input type="checkbox"/>	Lasing animals or use of grazing fields
<input type="checkbox"/>	<input type="checkbox"/>	Management of a nursery	<input type="checkbox"/>	<input type="checkbox"/>	Rotation of the pastures
<input type="checkbox"/>	<input type="checkbox"/>	Variety of plants in nursery	<input type="checkbox"/>	<input type="checkbox"/>	other

23 Why did you stop with the innovations?

<input type="checkbox"/>	Not interested	<input type="checkbox"/>	Not enough production
<input type="checkbox"/>	I see no profit	<input type="checkbox"/>	Does not work
<input type="checkbox"/>	Expensive	<input type="checkbox"/>	Not enough space
<input type="checkbox"/>	No examples for improvement	<input type="checkbox"/>	No materials
<input type="checkbox"/>	No one wants to learn me	<input type="checkbox"/>	other

24. Do you think your live has been improved thanks to Pachamama Raymi? no / a bit / regular / much

- If not: why?

- What did improve? better food / more production / more money / selling more / better health / better house / better future / other

25. What mark would you give Pachamama Raymi on a scale of 0 -20? 00 - 03 - 05 - 07 - 10 - 12 - 15 - 17 - 20

26. Do you want Pachamama Raymi to return? yes / no

If no: why not?

27. If Pachamama Raymi would return, what would you like to learn more/improve?

Started with innovations after the project

28. did you start with innovation after the project? Yes (continue to 29)/ no (continue to 34)

29. with which innovation did you start after the project? (table 4)

Table 4: for question29

Start	Innovation	Start	Innovation
<i>Innovations concerning living, health, livestock and business</i>			
<input type="checkbox"/>	Improved stove	<input type="checkbox"/>	presentation of living area
<input type="checkbox"/>	Maintenance and use of bathroom	<input type="checkbox"/>	Order in living area
<input type="checkbox"/>	dump	<input type="checkbox"/>	Separate bedroom
<input type="checkbox"/>	Room for products (food)	<input type="checkbox"/>	Room for tools
<input type="checkbox"/>	Register animals	<input type="checkbox"/>	Vaccinate/medicate animals
<input type="checkbox"/>	Separating animals from living area	<input type="checkbox"/>	Making products (cheese, yogurt etc.)
<input type="checkbox"/>	Stables for animals	<input type="checkbox"/>	other
<i>Innovations concerning irrigation, cultivation, pastures and forestation</i>			
<input type="checkbox"/>	Management of irrigation system	<input type="checkbox"/>	Forestation plan
<input type="checkbox"/>	Use of biol	<input type="checkbox"/>	Plantations
<input type="checkbox"/>	Use of biocide	<input type="checkbox"/>	Management of the plantations
<input type="checkbox"/>	Use of humus and compost	<input type="checkbox"/>	Variety of potatoes
<input type="checkbox"/>	Control of weeds and pests	<input type="checkbox"/>	Pasture plan
<input type="checkbox"/>	Organic vegetable garden and fruits	<input type="checkbox"/>	Ordering of pastures
<input type="checkbox"/>	Introduction of onions	<input type="checkbox"/>	Sowing of the pastures
<input type="checkbox"/>	Construction of terraces or andenes	<input type="checkbox"/>	Recovery of stripped areas
<input type="checkbox"/>	Restoration of terraces or andenes	<input type="checkbox"/>	Lasing animals or use of grazing fields
<input type="checkbox"/>	Management of a nursery	<input type="checkbox"/>	Rotation of the pastures
<input type="checkbox"/>	Variety of plants in nursery	<input type="checkbox"/>	other

30. why did you start with the innovation?

From a friend / the municipally ordered me to / other project introduced it / saw benefits in other houses and fields

Other:

31. when did you start with the innovation?

Immediately after the project / half a year after the project / one year ago / less than a year ago

32. are you happy with your innovation? Yes / no / do not know

Why?

33. did you stop with any of these innovations? yes / no

If yes: see table 4 and 3

34. did you change innovations after starting with them? yes / no

If yes: see table 4

Why did you change?

a friend told me / the municipally ordered me to / other project introduced it / saw benefits in other houses and fields /

Other:.....

Never used innovations of Pachamama Raymi:

36. why did you never use innovations of Pachamama?

Not interested / I do not know Pachamama / I already have a good farm / innovations won't work / never thought of it / other....

37 are you thinking of starting with any of Pachamama's innovations? yes/no

If yes: which ones?

Start	Innovation	Start	Innovation
<i>Innovations concerning living, health, livestock and business</i>			
<input type="checkbox"/>	Improved stove	<input type="checkbox"/>	presentation of living area
<input type="checkbox"/>	Maintenance and use of bathroom	<input type="checkbox"/>	Order in living area
<input type="checkbox"/>	dump	<input type="checkbox"/>	Separate bedroom
<input type="checkbox"/>	Room for products (food)	<input type="checkbox"/>	Room for tools
<input type="checkbox"/>	Register animals	<input type="checkbox"/>	Vaccinate/medicate animals
<input type="checkbox"/>	Separating animals from living area	<input type="checkbox"/>	Making products (cheese, yogurt etc.)
<input type="checkbox"/>	Stables for animals	<input type="checkbox"/>	other
<i>Innovations concerning irrigation, cultivation, pastures and forestation</i>			
<input type="checkbox"/>	Management of irrigation system	<input type="checkbox"/>	Forestation plan
<input type="checkbox"/>	Use of biol	<input type="checkbox"/>	Plantations
<input type="checkbox"/>	Use of biocide	<input type="checkbox"/>	Management of the plantations
<input type="checkbox"/>	Use of humus and compost	<input type="checkbox"/>	Variety of potatoes
<input type="checkbox"/>	Control of weeds and pests	<input type="checkbox"/>	Pasture plan
<input type="checkbox"/>	Organic vegetable garden and fruits	<input type="checkbox"/>	Ordering of pastures
<input type="checkbox"/>	Introduction of onions	<input type="checkbox"/>	Sowing of the pastures
<input type="checkbox"/>	Construction of terraces or andenes	<input type="checkbox"/>	Recovery of stripped areas
<input type="checkbox"/>	Restoration of terraces or andenes	<input type="checkbox"/>	Lasing animals or use of grazing fields
<input type="checkbox"/>	Management of a nursery	<input type="checkbox"/>	Rotation of the pastures
<input type="checkbox"/>	Variety of plants in nursery	<input type="checkbox"/>	other

Questions concerning irrigation, cultivation, pastures and forestation

38. How often do you use biol? More than 2 times a month / 2 times a month / monthly / two times a year / yearly

39. How often do you use biocida? More than 2 times a month / 2 times a month / monthly / two times a year / yearly

40. Did your harvest increase on the new terraces or andenes? no / a bit / sufficient / much

41. What part of your land consists of terraces or andenes? m²/ha/topo

42. What part of your land consists of pastures? m²/ha/topo

43. How many animals do you own?

44. How many plants do you have in your nursery? Less than 500 / 501-1000 / 1001-2000 / 2001-3000 / more than 3000

45. How many varieties do you have in your nursery or plantation? varieties?

Adoption of innovations during and after the Pachamama Raymi project

Table 1: adoption of innovations during the contests (1 and 2) and before and after the project.

1	2	prior	after	now	changed	stopped	mark	innovation	1	2	prior	after	now	changed	stopped	mark	innovation
Innovations concerning living, health, livestock and business																	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Improved oven	<input type="checkbox"/>		presentation of living area						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Maintenance and use of bathroom	<input type="checkbox"/>		Order in living area						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		dump	<input type="checkbox"/>		Separate bedroom						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Room for products (food)	<input type="checkbox"/>		Room for tools						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		Vaccinate/medicate animals						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Separating animals from living area	<input type="checkbox"/>		Making products (cheese, yogurt etc.)						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Stables for animals	<input type="checkbox"/>		Subscribed in SIS						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Use of closets	<input type="checkbox"/>		Registration of violence in home						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Medication with antiparasites for family	<input type="checkbox"/>		Tools stored in suitable place						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Painting of the walls	<input type="checkbox"/>		Owens couches, chairs etc.						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Fixed floors and ceilings	<input type="checkbox"/>		Vaccinate animals						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Selling of guinea pigs	<input type="checkbox"/>		Sufficient food for animals through the year						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		Investment in animals						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Checking for internal or external parasites on animals	<input type="checkbox"/>		Other						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Prevent inbreeding	<input type="checkbox"/>								
Innovations concerning irrigation, cultivation, pastures and forestation																	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Introduction of onions	<input type="checkbox"/>		Forestation plan						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Use of biol	<input type="checkbox"/>		Plantations						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Use of biocide	<input type="checkbox"/>		Management of the plantations						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Use of humus and compost	<input type="checkbox"/>		Pasture plan						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Control of weeds and pests	<input type="checkbox"/>		Ordering of pastures						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Organic vegetable garden and fruits	<input type="checkbox"/>		Sowing of the pastures						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Selection of seeds	<input type="checkbox"/>		Recovery of stripped areas						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Management of irrigation system	<input type="checkbox"/>		Lasing animals or use of grazing fields						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Construction of terraces or andenes	<input type="checkbox"/>		Rotation of the pastures						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Restoration of terraces or andenes	<input type="checkbox"/>		other						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Management of a nursery	<input type="checkbox"/>								

Never used innovations of Pachamama Raymi

31. Why did you never used innovations of Pachamama Raymi?

<input type="checkbox"/>	Not interested	<input type="checkbox"/>	Not enough production
<input type="checkbox"/>	I see no profit	<input type="checkbox"/>	Does not work
<input type="checkbox"/>	Expensive	<input type="checkbox"/>	Not enough space
<input type="checkbox"/>	No examples for improvement	<input type="checkbox"/>	No materials
<input type="checkbox"/>	No one wants to learn me	<input type="checkbox"/>	other

32. Are you thinking of using innovations of Pachamama Raymi? yes / no

If yes: which ones?

33. Did you participate in a project of another organization/institution? Yes / No

If yes: which organization/institute? Caritas / Oikos / Flora Tristan / Other

34. If Pachamama Raymi would return, Would you like to participate?

Questions concerning irrigation, cultivation, pastures and forestation

35. How often do you use biof? More than 2 times a month / 2 times a month / monthly / two times a year / yearly

36. How often do you use biocida? More than 2 times a month / 2 times a month / monthly / two times a year / yearly

37. Did your harvest increase on the new terraces or andenes? no / a bit / sufficient / much

38. What part of your land consists of terraces or andenes? m²/ha/topo

39. What part of your land consists of pastures? m²/ha/topo

40. How many animals do you own? cows sheepgoatsdonkeyshorses other

41. How often do you rotate your pastures? daily / 2 times a week / weekly / 2 times a month / monthly / less than monthly

42. How many plants do you have in your nursery? Less than 500 / 501-1000 / 1001-2000 / 2001-3000 / more than 3000

43. How many varieties do you have in your nursery or plantation? varieties

44. How many varieties potato do you have? varieties

Appendix 5: Use of innovations Yauyos

Nr	Innovation	before		contest 1		contest 2		Difference contest 1 -2		average contests		continuance		Adoption rate		Started after contest		Stopped after contest		Difference contest-now	
		cnt*	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%
1	improved stove	18	21,2%	55	64,7%	59	69,4%	4	4,7%	57	67,1%	66	77,6%	48	56,5%	5	5,9%	7	8,2%	-2	-2.3%
2	Stables for animals	1	1,2%	11	12,9%	12	14,1%	1	1,2%	11,5	13,5%	15	17,6%	14	16,5%	2	2,4%	1	1,2%	1	1.2%
3	Vaccination	59	69,4%	56	65,9%	63	74,1%	7	8,2%	59,5	70,0%	65	76,5%	6	7,1%	0	0,0%	3	3,5%	-3	-3.5%
4	making products	44	51,8%	47	55,3%	58	68,2%	11	12,9%	52,5	61,8%	48	56,5%	4	4,7%	0	0,0%	15	17,6%	-15	-17.6%
5	Onions	13	15,3%	53	62,4%	67	78,8%	14	16,5%	60	70,6%	44	51,8%	31	36,5%	2	2,4%	29	34,1%	-27	-31.7%
6	Biol	2	2,4%	39	45,9%	47	55,3%	8	9,4%	43	50,6%	21	24,7%	19	22,4%	0	0,0%	26	30,6%	-26	-30.6%
7	vegetable garden	27	31,8%	54	63,5%	67	78,8%	13	15,3%	60,5	71,2%	62	72,9%	35	41,2%	3	3,5%	13	15,3%	-10	-11.8%
8	seedling nursery	6	7,1%	28	32,9%	34	40,0%	6	7,1%	31	36,5%	27	31,8%	21	24,7%	0	0,0%	11	12,9%	-11	-12.9%
9	Plantations	21	24,7%	41	48,2%	49	57,6%	8	9,4%	45	52,9%	52	61,2%	31	36,5%	2	2,4%	4	4,7%	-2	-2.3%
10	Recovery	14	16,5%	27	31,8%	32	37,6%	5	5,9%	29,5	34,7%	32	37,6%	18	21,2%	0	0,0%	3	3,5%	-3	-3.5%
11	Rotation	48	56,5%	48	56,5%	59	69,4%	11	12,9%	53,5	62,9%	63	74,1%	15	17,6%	0	0,0%	0	0,0%	0	0%

* count

Differences in percentages are calculated by subtracting one percentage from another:

Difference contest-now = %Started after contest - %stopped after contest

Difference contest 1 and 2= %contest2-%contest1.

Adoption rate = %continuance-%before.

Appendix 6: Use of Innovations Valle Sagrado

Nr.	Innovation	Before		Contest 1		Contest 2		Difference contest 1 - 2		Average contests		continuance		Started after contest		Stopped after contest		Difference contest- now	
		cnt*	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%	cnt	%
1	Improved stove	-	-	60	87,0%	55	79,7%	-5	-7,2%	57,5	83,3%	60	87,0%	0	0,0%	0	0,0%	0	0.0%
2	Stables for animals	-	-	39	56,5%	38	55,1%	-1	-1,4%	38,5	55,8%	45	65,2%	6	8,7%	0	0,0%	6	8.7%
3	Vaccination	-	-	57	82,6%	54	78,3%	-3	-4,3%	55,5	80,4%	59	85,5%	3	4,3%	1	1,4%	2	2.9%
4	Making products	-	-	17	24,6%	16	23,2%	-1	-1,4%	16,5	23,9%	17	24,6%	0	0,0%	0	0,0%	0	0.0%
5	Onions	-	-	58	84,1%	54	78,3%	-4	-5,8%	56	81,2%	53	76,8%	0	0,0%	5	7,2%	-5	-7.2%
6	Biol	-	-	49	71,0%	46	66,7%	-3	-4,3%	47,5	68,8%	47	68,1%	4	5,8%	7	10,1%	-3	-4.3%
7	Vegetable garden	-	-	54	78,3%	50	72,5%	-4	-5,8%	52	75,4%	52	75,4%	3	4,3%	5	7,2%	-2	-2.9%
8	Seedling nursery	-	-	22	31,9%	20	29,0%	-2	-2,9%	21	30,4%	21	30,4%	0	0,0%	2	2,9%	-2	-2.9%
9	Plantations	-	-	53	76,8%	50	72,5%	-3	-4,3%	51,5	74,6%	54	78,3%	2	2,9%	0	0,0%	2	2.9%
10	Recovery	-	-	44	63,8%	42	60,9%	-2	-2,9%	43	62,3%	44	63,8%	0	0,0%	0	0,0%	0	0.0%
11	Pasture rotation	-	-	55	79,7%	52	75,4%	-3	-4,3%	53,5	77,5%	55	79,7%	0	0,0%	0	0,0%	0	0.0%

*count

Differences in percentages are calculated by subtracting one percentage from another:

Difference contest-now = %Started after contest - %stopped after contest

Difference contest 1 and 2= %contest2-%contest1.

Appendix 7: SPSS cross tables

7.1 Discontinuance of onions * product use

For onions: 1 = Discontinuance
0 = No discontinuance

For product use: 1 = Products for own consumption
2 = Selling a part of products
3 = Selling nearly all products (+70%)

Cebolla deajo de usar * productuse Crosstabulation

		product use			Total	
		1	2	3		
Cebolla deajo de usar	0	Count	16	34	5	55
		% within Cebolla deajo de usar	29,1%	61,8%	9,1%	100,0%
Cebolla deajo de usar	1	Count	14	8	7	29
		% within Cebolla deajo de usar	48,3%	27,6%	24,1%	100,0%
Total		Count	30	42	12	84
		% within Cebolla deajo de usar	35,7%	50,0%	14,3%	100,0%

7.2: Continuance of seedling nursery*use of seedling nursery before project

Continuance: 0 = no continuance
1= continuance

Before: 0= not using the innovation before the project
1= using the innovation before the project

vivero Sigue usando * vivero tenia antes Crosstabulation

		vivero tenia antes		Total	
		0	1		
vivero Sigue usando	0	Count	57	1	58
		% within vivero Sigue usando	98,3%	1,7%	100,0%
vivero Sigue usando	1	Count	22	5	27
		% within vivero Sigue usando	81,5%	18,5%	100,0%
Total		Count	79	6	85
		% within vivero Sigue usando	92,9%	7,1%	100,0%

7.3 Previous use of vegetable garden* percentage of income derived from agriculture

Vegetable garden: 0 = Not used before the project
1= Used before the project

%Agri: 1= 0-33%
2= 33%-66%
3= 66% - 100% (including products for own consumption only)

huerto tenia antes * %Agri Crosstabulation

		%Agri			Total
		1	2	3	
0	Count	31	5	21	57
	% within huerto tenia antes	54,4%	8,8%	36,8%	100,0%
1	Count	7	3	17	27
	% within huerto tenia antes	25,9%	11,1%	63,0%	100,0%
Total	Count	38	8	38	84
	% within huerto tenia antes	45,2%	9,5%	45,2%	100,0%