The Impact of Geographical Distance on the Performance Evaluation of a Peruvian Cocoa Cooperative: Acopagro Cooperative Case study

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Abstract

In this work, the improvements that influenced the participation of the farmers in the cooperative were analyzed. A survey of 125 farmers was carried out in Juanjui using Principal Components Analysis (PCA) and cluster analysis in order to assess the underlying opinions of the cocoa farmers. The evaluation of Acopagro's performance was negative when communities were located far from the cooperative headquarters. Alternatively, the closer the communities were to Juanjui and the more direct the relationship with the importers was, the more satisfied farmers were with the cooperative performance. Enforcement of the gatherers' loyalty in each village is needed for farmers' competitiveness in the market.

Key words: Cooperative, Principal Component Analysis, Cluster analysis, Peruvian jungle, cocoa, communities, geographical distance

Introduction

Cooperatives and farmers' associations play a vital role in providing support to farmers for the conversion of their production, the adoption of quality standards, and the reduction in the cost of information gathering (Wollni and Zeller 2007). Nonetheless, the problems related to internal organization and individual incentive should not be overlooked. A matter of importance is to have a structure that gives benefits to group effort while retaining individual initiative (Meyer 1991).

While developing countries often have deficient and inadequate marketing systems (Norton, Alwang and Masters 2006), and smallholder agricultural producers in Latin America today face multiple challenges and opportunities that arise from an increasingly globalized economy that has transformed the way the state, private investors, and rural producers interact (Vasquez-Leon 2010), the cooperatives or associations nevertheless have access to a promising means of tackling rural poverty. Indeed, this access is possible despite the fact that agriculture development remains at a subsistence level in the Peruvian jungle region (Porras Martinez 2000).

The incentives that cooperatives offer their members are closely tied to their performance. Hence, in order to clarify the cooperative's role in the

agriculture sector, understanding the benefits and limitations of the cooperative itself is necessary (Warren, Mather and Preston 1980). Moreover, social factors are of paramount importance in defining relationships in rural communities and influencing economic decisions (Presno 2001), which in turn also impacts the cooperative's role.

As a direct consequence of terrorism and drug trafficking, farmers in the Peruvian jungle were left to fend for themselves in the free market without financial or technical support. Nowadays, Peru is the world's second largest producer of coca leaves with an estimated 61,200 hectares of plantations, 92% used for illicit purposes (UNODC, 2010). Therefore, international organizations like the United Nations Office on Drugs and Crime (UNODC) introduced projects to cultivate alternative crops such as organic tea, rubber, oil palm, coffee and cocoa. Peruvian cocoa cultivation rose on 2010, reaching 77,192 ha (Peruvian Ministry of Agriculture, 2011). Such growth follows the boom in Peruvian exports locating Peru as the world's thirteenth largest exporter cacao. The Acopagro cooperative, a Peruvian organization created in 1992 with United Nations support, for example, has contributed to the shift from illegal crops like coca to alternative crops like cocoa. This change helps small-scale farmers in the Peruvian jungle to increase and diversify their income in a legal and sustainable way, while preserving the environment at the same time.

An important task is to analyze how trust and reliability between the cooperative and its members make it easier for the relationship to be efficient, give stability to the organization, act as a way of self-affirmation and reproduction, and encourage cooperation. Many cooperatives and associations in Latin America have experienced ongoing weak economic performances (Presno 2001). The failure of the Peruvian cooperatives in the 1980s due to corruption and government intervention has meant that farmers have little trust in these types of associations (Torre Villafane 1995). Nevertheless, despite the fact that it is located in a remote zone in the jungle region, Acopagro has contributed to its members' welfare.

Access to information through roads, basic telecommunications, and news services can give a competitive advantage to particular groups of farmers or traders (Norton, Alwang and Masters 2006). Juanjui city is the capital of the Mariscal province, San Martin region, where the Acopagro cooperative headquarters are located. Many towns flourished near the Abiseo River from its source to its confluence with the Huayabamba River. Thus, in order for cocoa to be commercialized in the various communities, cocoa would need to be shipped, primarily by boat, to the Acopagro cooperative. Distance and a lack of transportation in many parts of the jungle are major constraints to expanding local production. Due to the nature of its isolation and the lack of basic infrastructure within the Peruvian jungle, the flow of information in the area is restricted and localized in certain specific areas. For instance, differences in market access among the five Machigengua Indian communities in the Peruvian Amazon confirmed that the less remote the community, the greater the market integration

(Heinrich 1997). Therefore, this study aims to identify how physical distance between the different distribution communities and the Acopagro cooperative headquarters influences the members' perception of the quality of the services that the Acopagro cooperative offers.

Data and Methodology

Little is known about the impact of geographical distance from the cooperative on the member's perceptions of the cooperative's performance. For the purposes of identifying the impact of physical distance on the performance evaluation of the Acopagro cooperative, a Likert scale survey with values ranging from 1- Strongly Agree to 7- Strongly Disagree was carried out between December 2009 and January 2010 in the main Peruvian cocoa production area, Juanjui-San Martin. Farmers from communities adjacent to or nearby the cooperative were selected to obtain a sample of 125 farmers. Table 1 presents the summary of survey responses based on the evaluation of the Acopagro cooperative performance.

Table 1. Summary of survey responses based on the Acopagro cooperative performance

Cooperatives' performance evaluation	Excellent	Very Good	Good	Satisfactory	Weak	Very weak	Unacceptable
Direct relationship with the farmers	42% (53)	30% (38)	15% (19)	8% (10)	2% (3)	2% (2)	0% (0)
Supervision of cocoa quality	23% (29)	32% (40)	34% (43)	8% (10)	2% (3)	0% (0)	0% (0)
Sale to external markets	66% (83)	18% (22)	15% (12)	3% (2)	0% (0)	1% (1)	1% (1)
Good quality of the cocoa varieties	36% (45)	34% (42)	23% (29)	2% (2)	4% (5)	2% (2)	0% (0)
Information about distribution	28% (35)	36% (45)	27% (34)	4% (5)	4% (5)	1% (1)	0% (0)
Post-harvesting management	38% (47)	32% (40)	24% (30)	4% (5)	2% (2)	0% (0)	1% (1)
Guidance for welfare improvement	28% (35)	34% (43)	35% (44)	2% (2)	1% (1)	0% (0)	0% (0)
Cooperation among members	18% (23)	34% (42)	38% (48)	6% (7)	3% (4)	1% (1)	0% (0)
Participation in decision making	17% (21)	26% (33)	38% (48)	7% (9)	6% (8)	3% (4)	2% (2)
Guidance given on agric. Technology	24% (30)	42% (52)	25% (31)	3% (4)	5% (6)	2% (2)	0% (0)
Further research for improvement	19% (24)	34% (43)	30% (37)	5% (6)	8% (10)	1% (1)	3% (4)
Communication among members	25% (31)	37% (46)	29% (36)	5% (6)	5% (6)	0% (0)	0% (0)
Programs aimed to educate members	21% (26)	42% (53)	26% (33)	6% (7)	4% (5)	1% (1)	0% (0)
Insurance	21% (26)	14% (18)	26% (33)	6% (7)	16% (20)	4% (5)	13% (16)
Cocoa processing	12% (15)	28% (35)	31% (39)	2% (3)	11% (14)	7% (9)	8% (10)
Medical attention	6% (8)	13% (16)	19% (24)	5% (6)	33% (41)	18% (23)	6% (7)
Elections proposed by members	23% (29)	36% (45)	34% (42)	5% (6)	2% (3)	0% (0)	0% (0)
Skilled managers	34% (43)	26% (33)	26% (32)	4% (5)	7% (9)	2% (2)	1% (1)
Managerial expertise	25% (31)	39% (49)	22% (28)	5% (6)	6% (8)	1% (1)	2% (2)
Transportation facilities	22% (27)	29% (36)	30% (38)	2% (3)	12% (15)	2% (3)	2% (3)
Cooperative's agents knowledge	45% (56)	29% (36)	18% (23)	2% (3)	2% (3)	2% (3)	1% (1)
Manager's leadership	26% (33)	38% (47)	30% (37)	3% (4)	3% (4)	0% (0)	0% (0)
Timely payment	17% (21)	26% (33)	34% (43)	10% (12)	8% (10)	5% (6)	0% (0)
Coordination level within the Coop.	18% (22)	38% (47)	37% (46)	2% (3)	4% (5)	0% (0)	2% (2)
Added value in the product	25% (31)	31% (39)	28% (35)	2% (3)	5% (6)	2% (3)	6% (8)
Objectives and planning in the Coop.	18% (23)	35% (44)	42% (52)	2% (3)	1% (1)	2% (2)	0% (0)

* Number of Acopagro cooperative members in parentheses

The Acopagro cooperative offers a broad array of services to its members, and these variables have a high correlation among each other. A direct usage of any of these variables or the use of regression approaches do not fully reflect the Acopagro members' perception of the quality of the services that the cooperative offers. This is why a Principal Component Analysis (PCA) was used as a variable reduction procedure to summarize the members' underlying opinions through small components. This procedure entailed grouping together the variables according to shared variance while retaining as much of the original information as possible. A more compressed evaluation allows a simple visualization of the relations' systems between variables and the individuals' evaluations of the services (Miguel, Góis and Silva 2010). Moreover, a cluster analysis was also used for grouping the farmers based on the principal component factor scores which we describe in the subsequent section (Field 2000). Using these component factor scores as variables for the cluster analysis, the different categories can be easily interpreted. Acopagro cooperative members can be clustered into subgroups: in this case by the geographical distance between the communities distributing the cocoa and the cooperative headquarters. This subgroup was

measured in ordered categories as follows: close, neutral, far, and very far. Similar response patterns shared common characteristics. As a result, the impact of geographical distance on the performance evaluation of the Acopagro cooperative can be identified and easily interpreted. Factor structure, reliability and cluster analysis are reported in the results section of this paper.

Acopagro members' perceptions regarding the cooperative services

Principal Component Analysis (PCA)[1] was used to extract factors in order to assess the farmers' underlying perception of the cooperative services. The number of components to be retained was guided by Kaiser's criterion (eigenvalues above 1) and the evaluation of the scree plot. Three components were retained (explaining 33.047%, 6.973% and 5.094% of the variance respectively) for further investigation, representing 45.114% of the total variance. Principal component analysis has been used to validate this questionnaire, therefore, it is important to ascertain how reliable the internal consistency of the scales are[2]. Once components have been extracted, loadings of the variables on each component are calculated. Factor rotation is used to discriminate those loadings between the components. The oblique rotation provided a far more interpretable solution than varimax rotation. In this case, within the oblique rotation method, oblimin rotation was chosen and two matrices were produced: a pattern matrix and a structure matrix. Inspection of the pattern and structure matrix shows three factor solutions: Component 1 represents the commercialization and marketing situation; Component 2 the cooperative's special services; and Component 3 the cooperative's planning and internal management situation. Table 2 shows the pattern and structure matrix for PCA with oblimin rotation of the three factor solution.

Table 2. Pattern and structure matrix for PCA with oblimin rotation of three factor solution

Item	Description	1st. component: Commercialization & marketing		2nd. component: Special services		3rd. component: Planning & management		Communalities
		Pattern	Structure	Pattern	Structure	Pattern	Structure	
Directrel	Direct relationship with the farmers	**0.751**	**0.787**	-0.026	0.159	0.084	0.448	0.624
Superv	Supervision of cocoa quality in the gathering center	**0.734**	**0.77**	0.066	0.237	0.042	0.419	0.598
Export	Sale to external markets (exportation)	**0.693**	**0.564**	-0.197	-0.087	-0.174	0.119	0.388
Variet	Good quality of the cocoa varieties	**0.645**	**0.658**	0.395	0.5	-0.149	0.264	0.583
Infdist	Information distribution for the farmers	**0.628**	**0.775**	-0.048	0.167	0.32	0.618	0.677
Postharv	Post harvesting management (product treatment)	**0.628**	**0.661**	0.076	0.222	0.033	0.361	0.444
Guidein	Guidance for increasing income and family improvement	**0.596**	**0.75**	0.011	0.216	0.307	0.603	0.634
Cooperation	Cooperation among members	**0.595**	**0.718**	0.065	0.248	0.219	0.528	0.559
Decispart	Participation in decision making	**0.552**	**0.515**	-0.089	0.024	-0.036	0.214	0.274
Agrictech	Give guidance on agricultural technology	**0.537**	**0.678**	-0.174	0.031	0.363	0.031	0.571
Othstudies	Further research in cooperative operations	**0.512**	**0.615**	0.376	0.499	0.043	0.499	0.519
Commb	Communication among members	**0.469**	**0.643**	0.202	0.369	0.264	0.544	0.52
Trainn	Programs aimed to educate members	**0.437**	**0.617**	0.068	0.245	0.336	0.568	0.477
Insurance	Insurance for stabilization of livelihood and welfare	-0.213	0.004	**0.875**	**0.841**	0.051	0.158	0.744
Treatm	Cocoa processing in the organization	-0.136	0.077	**0.715**	**0.712**	0.114	0.22	0.524
Medassist	Medical attention	0.074	0.126	**0.67**	**0.64**	-0.192	0.006	0.437
Elections	Elections are proposed by the members	-0.21	0.216	-0.007	0.157	**0.867**	**0.763**	0.615
Knowledge	Skilled managers	-0.084	0.244	-0.244	-0.074	**0.775**	**0.675**	0.521
Managem	Managerial expertise	0.129	0.409	0.048	0.208	**0.548**	**0.623**	0.404
Transp	Transportation facilities	0.117	0.406	0.142	0.295	**0.523**	**0.615**	0.411
Tassist	Cooperative's employees' technical assistance knowledge	0.228	0.453	-0.101	0.071	**0.501**	**0.589**	0.392
Leader	Manager's leadership	0.36	0.587	-0.049	0.147	**0.482**	**0.648**	0.516
Payontim	Payment on time by the accounting section to the members	0.051	0.288	0.036	0.16	**0.465**	**0.499**	0.252
Coordin	Coordination level within the organization	0.06	0.327	0.195	0.318	**0.454**	**0.531**	0.323
Addvalue	Added value of the product	0.031	306	0.25	0.365	**0.447**	**0.523**	0.335
Objplan	Objectives and planning of the organization	0.327	0.569	0.205	0.374	**0.401**	**0.611**	0.508

* Originally the survey contained 34 services. Finally, they were reduced to 26 items because all loadings less than .4 were suppressed in the output.

The cooperative's commercialization and marketing situation in the first component represents the commercial links between the organization and the farmers. The Acopagro cooperative encourages members to improve the quality of their cocoa in order to satisfy international demand. As the cooperative is not just based on economic considerations but also on social relationships, these factors drive economic cooperation.

The cooperative's special services component (second component) includes three items: insurance, medical attention and cocoa processing. In this particular component, although farmers generally positively evaluate these three items, negative opinions were also expressed. For this reason, a large percentage of Acopagro members suggested that these services should be urgently addressed. First of all, as an example, the Acopagro cooperative is currently offering funeral, not life insurance, to its members, which is why the score on this issue is low. Secondly, in Peru, just one quarter of the population benefits from national health

insurance, and the poorest are generally excluded from this system (Bardales del Aguila 2002). Hence, Acopagro cooperative members reported that medical attention is not currently a service provided by the cooperative. However, in the past, Acopagro has sent doctors to the communities to check up on their members and their families. Finally, farmers pointed out that the cocoa treatment is still underdeveloped due to the fact that the association just exports the cocoa beans only as a raw material and not as a manufactured product.

The third component represents the planning and management within the cooperative. Poor managerial decisions can negatively affect the cooperative (Presno 2001). In this case, the cooperative has provided constant training to the members through the communities' agents that go to the villages and provide one-on-one and group training for farmers on a variety of agricultural topics. This service is reflected in the members' positive evaluation in the questionnaire.

Generally speaking, the word "cooperative" has negative connotatons for the poor in rural Peru, since these entities are typically less successful than other types of local organizations. Political, organizational, and technical skills are often in short supply among disadvantaged groups in rural areas (Esman and Uphoff 1988). Nonetheless, in this case, Acopagro members' perceptions of the quality of the services is positive with an over 70% approval rating on the three different components related to the services that the cooperative offers.

Influence of the geographical distance between the distribution communities and the cooperative's headquarters

The factor scores obtained from the Principal Component Analysis (PCA) were subjected to cluster analysis to group farmers with similar patterns based on the communities that distribute cocoa to the Acopagro cooperative. Four clusters were assessed using the dendrogram[3] from the hierarchical cluster analysis and were intercepted with the three components in order to prove if the physical distance among the different distribution communities and the cooperative headquarters influences the evaluations of the members of the cooperative in the communities about the cooperative's performance. Figure 1 shows the hierarchical cluster analysis dendrogram that illustrates a graphical portrayal of the quantitative relationship among the four clusters. The vertical axis corresponds to the Ward method's distance, which measures the quantitative similarity between the clusters.
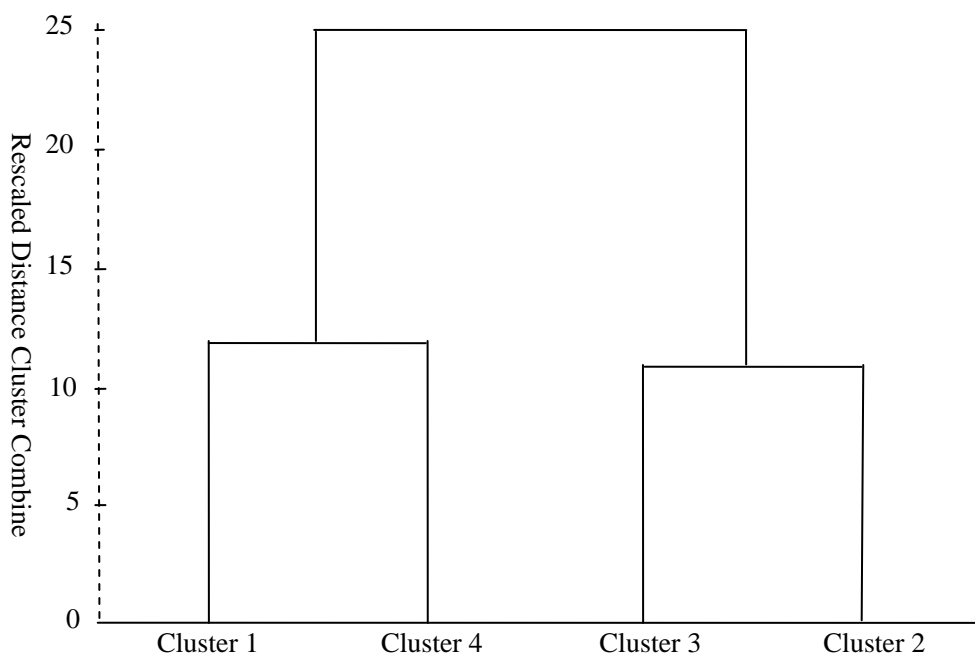
Figure 1. Hierarchical cluster analysis dendogram using the Ward Method

Figure 2, Figure 3, and Figure 4 below help to explain the position of the clusters and their interpretation. Table 3 helps explain the figures.
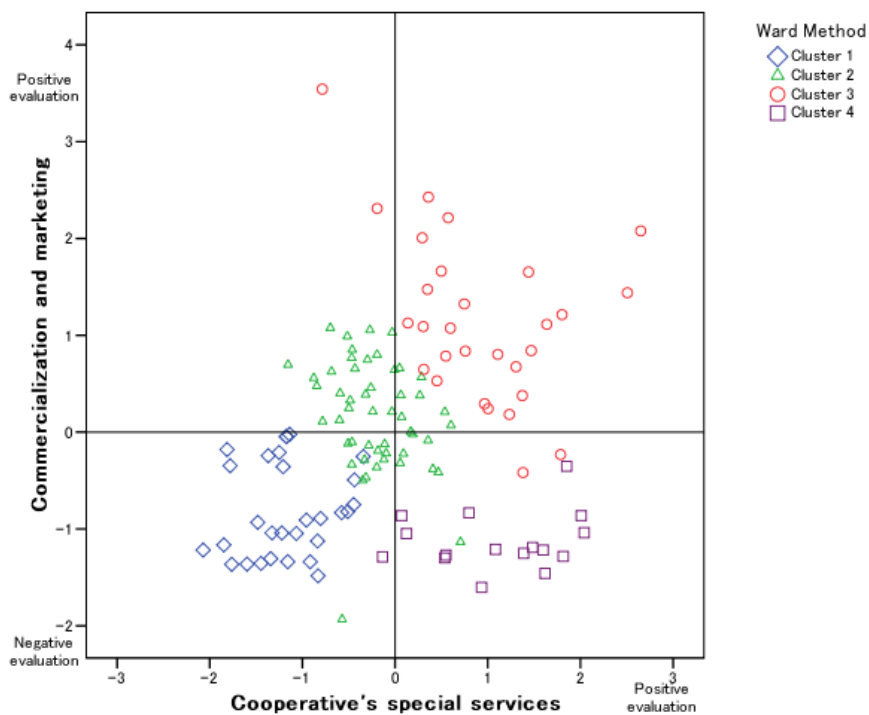
Figure 2. Cluster analysis: Commercialization and marketing component vs. cooperative's special services component
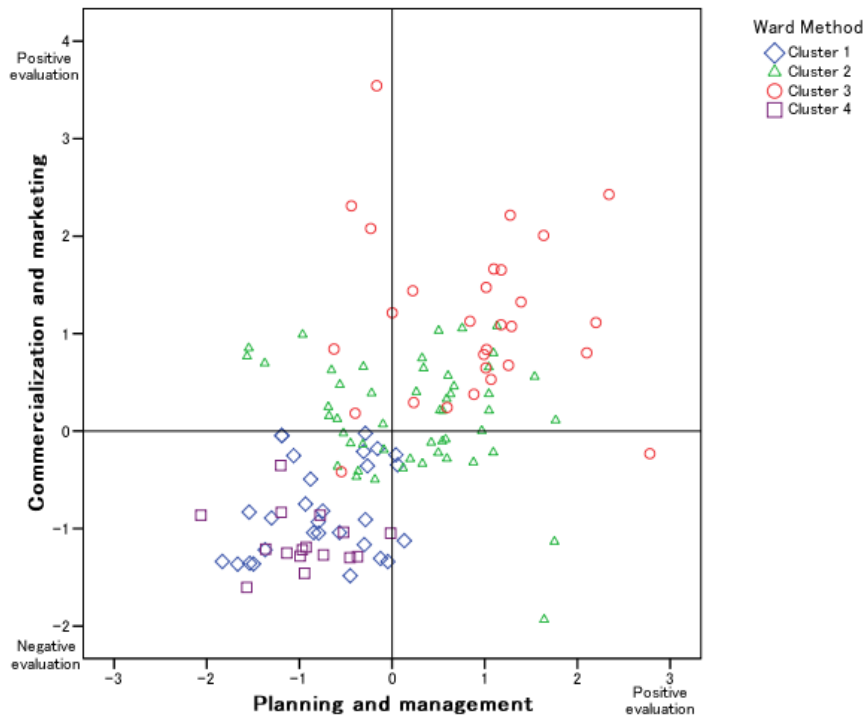
Figure 3. Cluster analysis: Commercialization and marketing component vs. cooperative's planning and management component
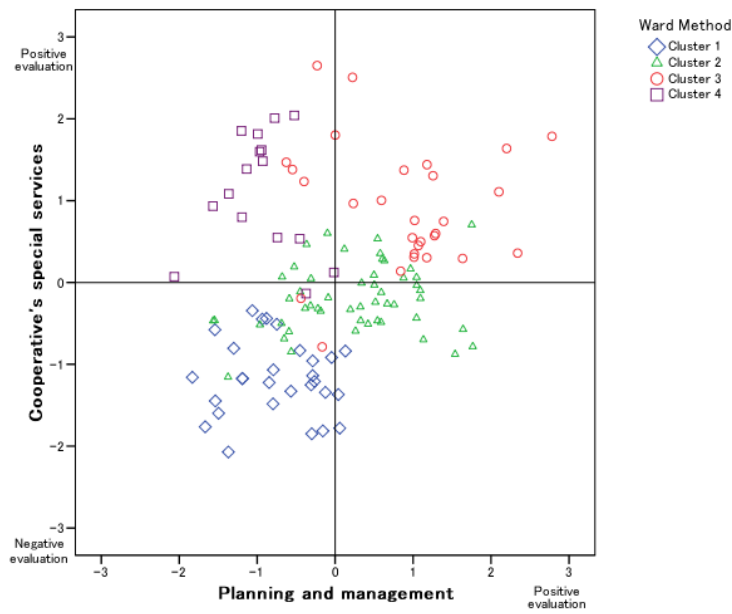
Figure 4. Cluster analysis: Cooperative's special services vs. cooperative's planning and management component

Table 3. Cross Table: Components vs. Clusters Evaluation

Component	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Commercialization & Marketing	(-)	(+/-)	(+)	(-)
Special Services	(-)	(+/-)	(+)	(+)
Planning & Management	(-)	(+/-)	(+)	(-)

Note: (+) means positive evaluation, (-) negative and (+/-) neutral evaluation

In all, 125 farmers were surveyed but eight farmers did not record the name of their community. Although 12 farmers wrote the name of their community, the sample was too small to consider it representative for the purposes of analysis. Hence, only 113 communities were considered for the cluster analysis explanation. Table 4 shows the number of farmers per community and their respective distances to the cooperative headquarters in Juanjui.

Table 4. Number of farmers per community as well as their respective distances to the cooperative headquarters in Juanjui

Communities	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total No. farmers	Distance to Acopagro
Shumanza	4	0	0	0	4	Far
Pasarraya	5	0	0	0	5	Far
Campanilla	4	0	0	0	4	Far
Huicungo	6	1	0	0	7	Neutral
Ricardo Palma	0	6	0	0	6	Close
Juanjuicillo	0	8	0	0	8	Close
Paltaico	0	6	0	0	6	Close
Pintillo	0	7	0	0	7	Close
Shepte	0	8	0	0	8	Close
Chambira	0	7	1	0	8	Close
Chorrillos	0	5	0	0	5	Close
Santa Rosa	0	0	6	0	6	Very far
San Pablo	0	0	5	0	5	Very far
Pucacaca	0	0	4	0	4	Very far
Dos de Mayo	0	0	4	0	4	Very far
Pachiza	0	0	7	0	7	Neutral
Cayena	0	0	1	4	5	Neutral
Bellavista	0	0	0	3	3	Neutral
Ledoy	0	0	1	2	3	Neutral
Saposoa	0	0	0	3	3	Neutral
Pajarillo	1	0	0	4	5	Neutral
Pampa hermosa	1	0	0	0	1	Very far
Nueva esperanza	1	1	0	0	2	Very far
Picota	1	0	0	0	1	Very far
Tres unidos	1	1	0	0	2	Very far
San Juan Abiseo	1	1	0	0	2	Very far
Vista alegre	1	0	0	0	1	Very far
Puerto Rico	1	0	0	0	1	Very far
Union	1	0	0	0	1	Far
Nueva union	1	0	0	0	1	Far
Total	29	51	29	16	125	

The clustering variables were profiled for the four-cluster solution to confirm that the differences between clusters are distinctive and significant in light of the research question and to define the characteristics of the clusters (Hair *et al.* 2010). The F statistics from one-way ANOVAs provide evidence that each cluster is distinctive. Thus, analysis demonstrates that statistically significant differences exist between the four clusters on each of the three components. The profiling information for the clusters is shown in Table 5.

Table 5. Mean values for Clusters

Component	Mean Values for Clusters								F	Sig
	Cluster 1		Cluster 2		Cluster 3		Cluster 4			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Commercialization & Marketing	-0.81	0.48	0.16	0.57	1.15	0.87	-1.13	0.30	71.01	0.00
Special Services	-1.17	0.46	-0.21	0.41	0.92	0.76	1.11	0.72	90.95	0.00
Planning & Management	-0.75	0.58	0.23	0.81	0.87	0.87	-0.95	0.49	32.64	0.00
Sample size	29		51		29		16		n= 125	

The Acopagro cooperative organized a system based on local committees instead of the organization of a central team of technicians who permanently visit farmers (Slingerland and Diaz Gonzalez 2006). Gatherers are very important in this particular marketing channel. They are a link between the Acopagro cooperative and the farmers from each community. They not only receive, ferment, and dry the cocoa delivered by each community's farmers, but they also send the cocoa to the Acopagro cooperative. Furthermore, they represent the Acopagro cooperative in the community by giving farmers the price per ton and providing information regarding the cooperative.

In the first cluster, the communities analyzed are far from the cooperative headquarters. Therefore, a lack of information, less control of the cooperative over the gatherers, and farmers' disagreements regarding the gatherer coupled with non-attendance at meetings could easily occur. Farmers from Pasarraya, Campanilla, and Shumanza communities are gathered in cluster 1, which is located in the negative side of the plotted distances to the cluster centers (Figures 2, 3, and 4 respectively). Farmers from cluster number 1 complained not just about medical attention, insurance, and methods to improve the cocoa varieties, but also about price stability, transportation, and the exact weight of the product at the time they give their cocoa to the gatherer.

In the second cluster, the analyzed communities are close to Juanjui (the cooperative headquarters). As a result, better communication, participation in meetings, and an easy flow of information and cocoa distribution are the main characteristics of this cluster. Farmers from Juanjuicillo, Ricardo Palma, Paltaico, Pintillo, Shepte, Chambira, and Chorrillos belong to this cluster number 2, located basically in the center of the three figures.

In the third cluster, farmers positively perceive the performance of the cooperative concerning the three components even though these communities are

located even farther away than the communities gathered in the first cluster to the cooperative headquarters. They do not have any problems regarding either the cooperative's rules or their gatherers. They also have certain benefits that other communities do not possess because they have direct relationship with the importers, who require cocoa beans from these specific zones. This relationship ensures that the community's welfare is improved since the importers provide high technology to produce the best quality cocoa and provide special support to these privileged areas. Communities that belong to this cluster number 3 are Santa Rosa, San Pablo, Pucacaca, and Dos de Mayo. This cluster is located in the above-right side quartile (positive sign).

In the fourth and the last cluster, farmers have positively evaluated the cooperative's special services. However, for farmers who belong to these communities that are located neither far nor close to the cooperative headquarters, the performance of the cooperative on two components (in commercialization and marketing and in planning and management within the organization) were rated as negative. Items that farmers suggested could be improved were: learning more about technology, preparing organic compost, managing disease and other items. Communities that belong to this cluster number 4 are Saposoa, Bellavista, Ledoy, Cayena, and Pajarillo. Figure 5 shows the map of the clusters structure.

Figure 5. Map of the Clusters Structure
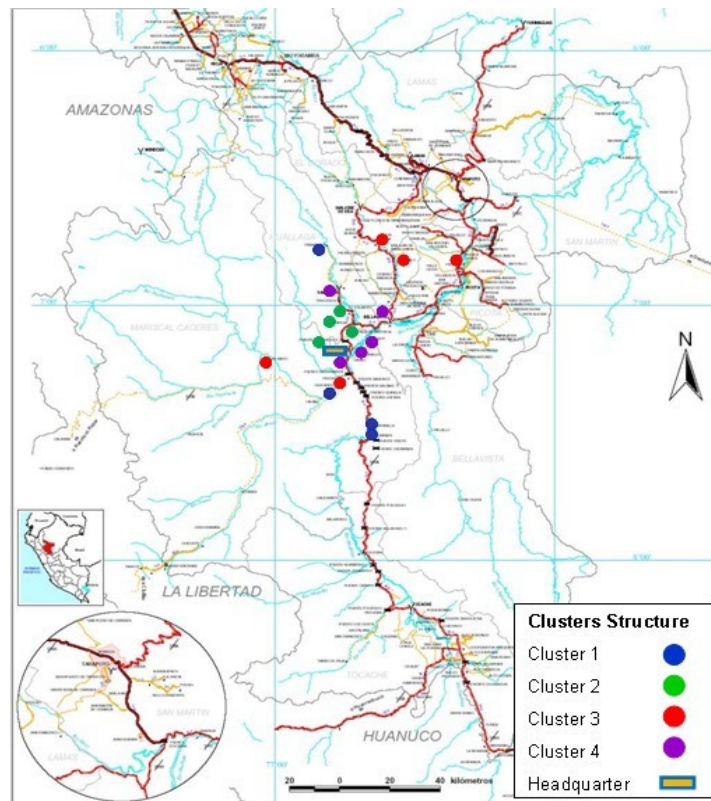
Source: Peruvian Ministry for Transport and Communication. 2011.

In essence, the outcomes show that the first cluster denotes a negative evaluation of the farmers in the three subscales: the second cluster - a neutral position; the third cluster - a positive evaluation, and the fourth cluster - a positive evaluation of the cooperatives' special services and a negative evaluation both in the external (commercialization and marketing) and internal situation (planning and management) of the cooperative. The results of this study show that geographical distance has a definite impact on the relationship between the differently distributed communities and the cooperative headquarters.

Conclusions:

Geographical distance between the cooperative headquarter in Juanjui and the communities has a greater influence on the farmers' opinions about Acopagro. Hence, it can be concluded that the farther away the communities were from Juanjui, the more difficult it is for the cooperative to control the gatherers' performance and their relationship with the farmers. These differences have caused these communities to experience different degrees of the Acopagro cooperative presence within the region. Nonetheless, the third cluster is the exception to the arguments of previous studies. As cocoa importers prefer to buy cocoa from one particular community due to the ability to trace it along the distribution chain, this community is equipped with better technologies and projects than other communities. Therefore, the farmers who belong to this community have a better opinion of Acopagro's performance than other communities who do not benefit from this assistance.

Policy Implication:

The cooperative has to strengthen the trust and loyalty of the farmers toward the gatherers in each village because the gatherers are the link between the cooperative and the farmers. This effort should be applied especially in the communities the farthest away from Juanjui. Moreover, the agents of the Acopagro cooperative who visit each community should be well trained and motivated. In this way, the cooperative creates governance structures that allow constant monitoring and consulting in order to strengthen its relationship with members and improve strategies for competitiveness and efficiency in the market.

Further studies:

Further studies are required to determine more precisely the magnitude of the problems regarding the relationship between the distance and the associations of the farmers in the Peruvian jungle with Acopagro. Using this model in a set of cooperatives over a larger geographical area in the jungle could confirm the results over a broader range. Furthermore, this study can be extended to other regions that might possess similar physical conditions by applying the same methodology presented in this paper. This extended study could provide a solid basis for stating a theory after comparing different cultures to recommend long term strategies to specific organizations serving members who are spread over a large geographic area.

Notes:

[1] PCA shows underlying scales in the questionnaire that relate to genuine sub-components of the cooperative's performance based on the members' opinions regarding the services that they receive through Acopagro. Barlett's test of sphericity was highly significant ($p<0.01$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value of 0.824 also supported the factorability of the matrix. Both tests in turn indicate that patterns of correlations are relatively compact, and the analysis should yield distinct and reliable factors (Field 2009).

[2] A generalized form of the split-half reliability is Cronbach's alpha (α) which splits data in two in every possible way and computes the correlation coefficient for each split. Internal consistencies are above 0.7, which is considered acceptable for the analysis (Field 2009). The Cronbach alpha value for the cooperative's marketing and commercialization situation is 0.905; for the cooperative's special services component it is 0.820 and for the cooperative's management and internal organization subscale, it is 0.820, which indicates good internal consistency.

[3] The dendrogram or tree diagram displays a visual representation of the distance at which clusters are combined. The clusters with the highest similarity (coefficients) are merged to form the nucleus of a larger cluster.

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Name of Interviewer: et

Survey Number:

Acopagro Cooperative Farmers' Survey

District:

How do you evaluate the cooperatives performance? Please put an X in the box that you feel best reflects your experience:

Cooperative's performance evaluation	Excellent	Very Good	Good	Satisfactory	Weak	Very weak	Unacceptable	Non applicable
1) Credits at a very low rate interest.								
2) High prices for the product.								
3) Receipt of utilities distribution by the end of the year.								
4) Insurance for stabilization of livelihood and welfare of member-farmers.								
5) Technical Assistance.								
6) Medical Attention.								
7) Provision of supply inputs as seeds, fertilizers, pesticides or minor irrigation equipment.								
8) Participation in the decision making.								
9) Cooperation among members in the Organization.								
10) People who are managing the Organization are skilled (have knowledge).								
11) The elections within the Organization are proposed by the members.								
12) Innovativeness and quality-consciousness of workers within the Organization.								
13) Guidance by the Organization for the increase of farm income and improvement of living.								
14) Marketing of cocoa.								
15) Further research for the efficient operation of the Organization								
16) Gives storage for the cocoa,								
17) Installation usage (eg. for lectures)								
18) Coordination and management expertise of the Organization for selling and the commercialization for the cocoa..								

19) Coordination level within the Organization.								
20) Cocoa processing in the Organization.								
21) Transportation facilities given by the Organization.								
22) Leadership of the Managers in the Organization								
23) Objectives and planning of the Organization.								
24) Information distribution for the farmers.								
25) Communication between members that use this marketing channel.								
26) Programs aimed at educating members in respect to self-development.								
27) Give guidance on agricultural technology.								
28) Payment on time established by contract.								
29) Supervision in cocoa standardization.								
30) Technology								
31) Post- harvest management (product processing).								
32) High quality cocoa varieties.								
33) Direct relationship with farmers.								
34) Sale to external markets (exportation).								

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Other factors and evaluation:

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Comments and/or Suggestions:

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Thank you very much for your cooperation.

Angie Higuchi.