OVERCOMING BARRIERS TO SUSTAINABLE FOOD SUPPLY CHAINS: THE ROLE OF RURAL ORGANISATION

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Abstract

Purpose: This paper is part of an on-going project relating to why and how to increase collaboration between food micro-producers. In this work we look at barriers perceived by independent farmers in Mexico (Sinaloa) during the development of their farming and commercial activities. Such barriers are often linked to the level of organisation among farmers, and we explore if this is a pertinent observation.

Research Approach: Secondary data from a Mexican rural census are used. Such data are compared, by means of scatter diagrams, to recognise patterns between barriers perceived by farmers, level of organisation, access to support and training, and access to credit. This comparison is done at the municipality level in order to recognise if there is a geographical propensity to collaborate. Initial insights reflect the need for complementary research approaches, particularly when studying the impact of individual preferences in the sustainability of supply chains involving rural communities.

Findings and Originality: Findings suggest (a) strong correlation between level of organisation among producers and additional access to resources (support, training and credit), and (b) not so strong correlation between frequency of perceived barriers and organisation or access to resources. This suggests that external funding is not enough to achieve farmers' satisfaction in rural communities. Other drivers involve the social dimension of sustainable supply chains, something that has been discussed only tangentially in supply chains literature. Accordingly, the main contribution of this paper is that we shows specific examples were links between barriers' perception among farmers and their level of organisation cannot be generalised; by doing so, we indicate the need for complementary research approaches when dealing with individuals' preferences and expectations.

Research Impact: Evidences are presented about how organisation between farmers may contribute to improve individual and collective performances. The research approach draws links between supply and value chains literature and the social dimension of sustainable development. The research procedure indicates the need for additional data in the census, but also limitations in this procedure to trigger change. A complementary approach seems also to be in need, as better economic performance does not seem to reduce the perception of barriers among farmers.

Practical Impact: This on-going research suggests that in order to support organisation between farmers in rural communities, there is a need for complementary approaches to design public policy-making. These approaches shall involve looking at individual actions and their contribution to collective development rather than the traditional approach focused on investing external resources.

Keywords: Barriers for collaboration, organization, food supply chain, small-farmers

Introduction

This paper reports on a desk research on farmers in Sinaloa (Mexico). It explores relations between barriers perceived by farmers during the development of their farming and commercial activities and their level of organisation. This is linked through two elements: (a) the types of organisations most commonly established in the area and (b) the impact that organisation levels have in overcoming perceived barriers. Even though it has been suggested that organisation might help mitigate barriers such as access to credit and training, no statistical analysis has been carried out, at least in Mexico, to assess whether efforts to organise famers actually strengthen their capacity and provide benefits. By analysing secondary data from the Mexican National Rural Census we carried out comparisons between different variables and their distribution to indicate potential relationships between the level of organisation and typical barriers to accessing modern and globalised supply chains.

During the last eight decades, Mexico has conducted farming census to understand the situation of the sector. This effort had the aim of providing support to the implementation of policies, plans and programmes concerning agriculture, forestry and livestock production (INEGI, 2016a). However, later in this paper we will indicate reasons why there is the need for additional information relating level of organisation between farmers and individual / collective performance.

The structure of this paper firstly provides a brief literature review concerning rural organisation and supply / value chains. Second, we set the background of the study by describing characteristics of rural communities in Mexico, with special emphasis on the state of Sinaloa. Third, we describe the research work that involves comparing farmers' organisation and other variables measured by the rural census. Fourth, several findings from the application will be offered. Fifth, an initial exploration on these findings is developed. Lastly, conclusions are drawn and future research identified.

Literature Review

Globalisation has produced both winners and losers among small-farmers. The winners have been small-holders who have either vertically integrated with agribusinesses or have devised institutional mechanisms (such as cooperatives) for collective action. The losers have been farmers who are poorly endowed in terms of natural resources, assets and infrastructure, who lack access to markets for outputs, inputs and land, as well as credit and insurance (von Braun and Díaz-Bonilla, 2008). Smallholder agricultural producers are typically unable to capitalise on the benefits of economies of scale and have lower market access and bargaining power, especially in rural areas. Therefore, they face higher transaction costs in most of non-labour transactions, such as the purchasing of inputs, capital access, or the selling of output (Latynskiy and Berger, 2016). It has also been recognised that the majority of farmers are smallholders, often illiterate, under-educated, with a lack of management and technical skills, and who have poor access to information and markets (Fayet and Vermeulen, 2014).

In the state of Sinaloa, Mexico, conditions are not dissimilar; a large number of rural communities face the challenge of maintaining their economic viability against the restructuring processes that globalisation has brought. This global integration demands competitive advantages rather than comparative ones (Ruiz-Ortega and Ruiz-Ochoa, 2014). In this context, farmers' organisations and collective action are often seen as key factors in enhancing farmers' access to markets (Hellin et al, 2007; Markelova and Meinzen-Dick, 2009).

In recent years, there has been a re-emerging interest in farmers' organisations and their capability to integrate small-farmers in particular. These organisations are seen as appropriate institutions for building capacity among small-farmers, for helping them to pool resources in order to access the specific assets needed for production and for helping them to participate in more competitive and globalised market environments (Fischer and Qaim, 2013; Trebbin, 2014; Blandon et al, 2009). Furthermore, it has been suggested that farmers' organisations can also offer different functions and services such as marketing, credit and insurance services, capacity development, input supply, market information and processing (Vermeulen et al, 2008). Nevertheless, little is known about the determinants of rural producer organisations' effectiveness in developing countries and their ability to provide benefits for their members. The knowledge gap is caused by high degrees of complexity and diversity of rural producer organisations and a lack of research evidence (Latynskiy and Berger, 2016). This paper contributes on dealing with this concern.

Description of the challenge

There is a general expectation that high levels of organisation shall support a higher access to external resources. This is expected to translate into a performance improvement. In a previous step of this on-going research, we conducted an initial exploration on the impact of collaboration in the sustainability of supply and value chains involving micro-producers (Michel-Villarreal and Vilalta-Perdomo, 2016). This paper builds on it, so we continue focusing our study on analysing organisational patterns in the state of Sinaloa.

Sinaloa, with a surface of almost 60 thousand square kilometres and a population of 3 million inhabitants, lies between the Pacific Ocean and the Sierra Madre Occidental, a chain of mountains with the highest peak at 2800 metres. It is the biggest agriculture producer in Mexico, contributing with almost 15% of the national production. Its area under cultivation involves 1.15 million of hectares and generates an income of £1.2 billion pounds; this makes Sinaloa the third biggest state in terms of cultivated surface (SAGARPA, 2016). The state is a long strip of land in the northwest of Mexico that covers a similar distance between London and the borders with Scotland. See figure 1 below.

Figure 1. Sinaloa state area in comparison with England

Sinaloa is administratively divided into 18 municipalities: Ahome, Angostura, Badiraguato, Choix, Concordia, Cosalá, Culiacán, El Fuerte, El Rosario, Elota, Escuinapa, Guasave, Mazatlán, Mocorito, Navolato, Salvador Alvarado, San Ignacio y Sinaloa. The capital of the state is Culiacán, and other important centres are Los Mochis (Ahome), important due to cotton farming, and Mazatlán, a fishing port and tourist destination for Canadian and US citizens.

The National Rural Census 2007 indicates the main barriers identified by farmers in Sinaloa. These are listed by type in Table 1.

Type of barriers	Percentage
Inputs prices	45.2%
Environmental issues	43.6%
Access to credit	33.6%
Soil fertility loss	16.7%
Insufficient infrastructure for food production and processing	9.2%
Commercialization	8.0%
Lack of training and technical assistance	7.4%
Other (e.g. conflicts on land ownership)	4.0%

Table 1. Percentage of perceived barriers by type
(It does not sum 100% as each interviewee may claim several barriers)

A previous step of this research indicated that barriers related to input prices are difficult to avoid by small and micro producers. For them there are apparently unsolvable challenges to fulfil the requirements established by big food retailers (Michel-Villarreal and Vilalta-Perdomo, 2016). Building from that, in this current step we will explore if traditional public policies have any impact in reducing the frequency of barriers perception. In this paper, we will review traditional areas in which governments usually focus, such as access to credit and training and technical assistance.

It is important to notice that Sinaloa's government has been active, and that some of these farmers have achieved certain level of collective organisation. Table 2 shows the reason why some farmers decided to participate in collective organisations.

Rationale behind the organising	Percentage
Collective buying	21.0%
Technical training	16.7%
Funding	14.6%
Commercialization	11.5%
Access to insurance	7.9%
Production by contract	4.3%
Price coverage	4.0%
Food processing	1.5%
Other reasons	18.6%

Table 2. Production units organised and rationale

Research work

This paper is based on the National Rural Census of 2007 that provides observations relating to 'production units'. A *production unit* is formed by a set of land properties located in the same municipality and own by the same individual(s) (INEGI, 2016b). The rationale behind the use of data at the level of municipalities has to do with current limitations of the census. The National Rural Census 2007 does not provide any data linking production units' organisation and the amount of support these receive. In this sense, it is not possible to confirm that organising production units will provide these with additional benefits in the forms of training, technical support or credit. One of our suggestions presented later in the 'Conclusions' section involves incorporating this data in future presentations of census data.

However, the census information provides useful insights at the municipality level. Information about organisation levels and type support are available. This information is compared by means of Scatter diagrams. These provide a visual indication of the correlation between two series of observations of what is observed.

Results/analysis

As expected, Figures 2 and 3 suggest that those municipalities with higher level of organisation are the ones with more access to training and technical assistance and credit.
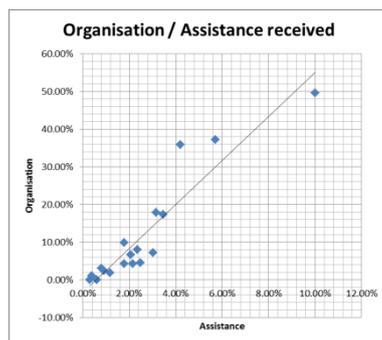

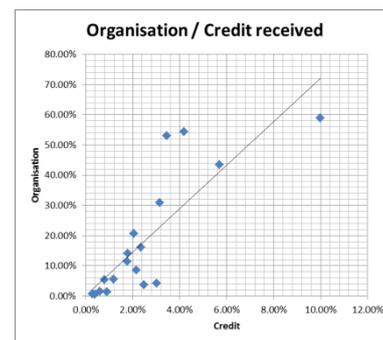Figure 2. level organisation vs assistance received   Figure 3. level organisation vs credit received

Furthermore, figure 4 shows a normalisation between the amounts of production units per municipality and the access to credit and assistance, considering the level of organisation. According to it, the municipality of Guasave shows a balance between all these variables. An equivalent behaviour can be seen in Ahome. Conversely, municipalities at the bottom of the figure 4 such as Badiraguato, Choix, Concordia, Cosalá and El Rosario show low level of organisation and also reduced amount of support. In these cases, the level of organisation seems to be independent to the amount of production units involved.

Other entities such as Culiacán and Sinaloa show an important amount of production units with a support proportionally higher to their level of organisation. The cases of Angostura and Navolato are of particular interest as they have a very high access to resources, mainly credit, in relation to their level of organisation.
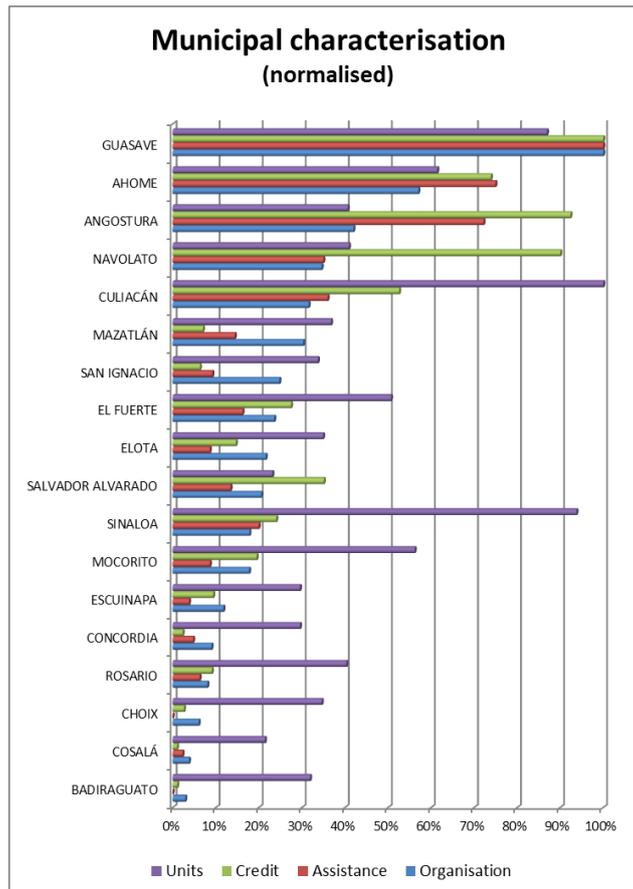
Figure 4. Characterisation of municipalities in terms of amount of production units, credit received, assistance received and level of organisation

Discussion

An initial reaction to previous findings might be to recommend municipalities to increase the amount of production units they have as a way to increase their level of organisation. Figure 5 seems to support this idea, as the distribution of production units seems to link with the level of organisation for each municipality. Accordingly, one possible municipal policy could be to support the creation of new businesses, perhaps by means of entrepreneurship programs.
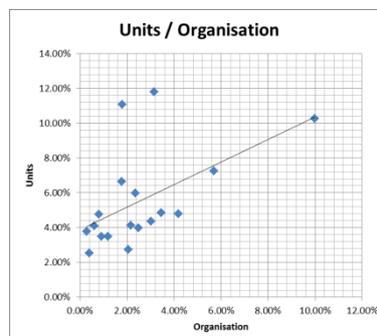

Figure 5. Amount of production units and level of organisation per municipality

However, there are two municipalities, Culiacán and Sinaloa, with a significant amount of production units that show low level of organisation. This indicates the need for additional research to identify reasons for this to happen. Nevertheless, it also suggests that municipalities interested in increasing

access to resources for farmers by means of organising their efforts, will need to do something beyond just creating new businesses. Additional support and nurturing seems to be required.

What seems to be the most striking outcome of this research can be seen in Figure 6. It shows that there is no definitive correlation between the frequency of perceived barriers and the level of organisation. In fact, the four municipalities where production units claim less perceived barriers involve all the ranges of organisation level.
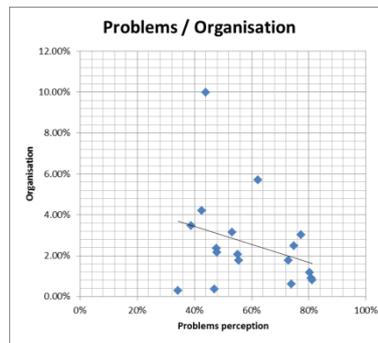

Figure 6. Barriers perceived and level of organisation per municipality

This discussion can be extended to the access to support and credit (figures 7 and 8).
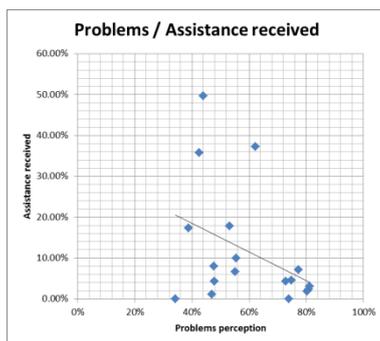

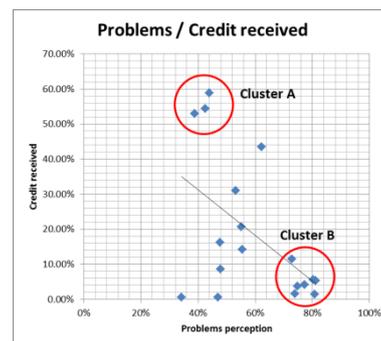Figure 7. Barriers perceived and assistance received by municipality

Figure 8. Barriers perceived and credit received by municipality

Figure 7 shows that in 15 out of 18 municipalities less than 20 % of their production units have received any technical assistance or training. Their perceptions around barriers involve a range between 34% and 81%. Probably the most extreme cases are Baridaguato and Choix; they received no support, but their perception on barriers lies between 34% and 74% respectively.

In figure 8 we distinguish two particular clusters, inside the red circle. Cluster A, concerning the municipalities of Angostura, Guasave and Navolato, indicate that receiving credit may reduce barriers perception. Conversely, cluster B suggests higher levels of discontent when credit availability is low. However, there is a significant amount of municipalities that do not seem to conform to this behaviour, almost 45% of the population.

Conclusions

Initial findings suggest a strong correlation between level of organisation among production units and additional access to resources (support, training and credit). This was expected and it can be

found in traditional literature reporting on entrepreneurship and regional development. What is striking for us is that no equivalent correlation between frequency of perceived barriers and organisation or access to resources was found. In this sense, recommending municipal governments to invest in entrepreneurial infrastructure, like business incubators, needs to be researched more in depth.

Additional information from the census is required. Authors will contact the Mexican Institute of Statistics and Geography (INEGI) to indicate the need for more information about organisation, collaboration, access to resources and performance. Nevertheless, a complementary research approach to study interactions between these variables is required. Quantitative analysis may provide some clues for improvement, but cannot act as triggers to increase individuals' propensity to organise and collaborate.

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