

Local Knowledge on the Chayote (*Sechium edule* Jacq. Swartz) Marketing in Rural Communities of Chiapas, Mexico

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Abstract: This study, presents a systematization of traditional knowledge regarding grower indicators for local marketing of chayote (*Sechium edule* Jacq. Swartz) in rural areas of the municipalities Villaflores and Villacorzo, Chiapas, Mexico through socio-anthropological analysis based on ethno-agronomy and ethno-botany. Through semi-structured interviews with 30 growers selected through an ethno-botanical exploration in each municipality, indicators regarding the local chayote marketing were identified. Chayote production is shown to provide a significant source of income for rural families of Villaflores and Villacorzo, 64% of growers of both municipalities directly market their harvest (without intermediaries) and 32% sell in local markets. Total 69% sell their products directly, the remaining growers turn to the informal selling places (streets). The 65% of growers of both municipalities set the prices of their product and 58% consume the excess product. Nevertheless, despite the demand and the commercial value of chayote in the municipalities studied, 55% of growers lack information to provide value added to their product, for example regarding form of presentation in the local market.

Key words: Local knowledge, ethno-agronomic exploration, traditional systems, Southeast Mexico, Chiapas

INTRODUCTION

In the face of the negative effects of globalization and market liberalization, development proposals with a local perspective have become increasingly important, as they revalue territory and promote actor participation in triggering processes of economic development and structural change which allow for improving living conditions (Boucher and Fraire, 2011).

In recent years, much has been written and discussed regarding the benefits and opportunities of local and regional food systems. This has generated ideas and experiences which support development and consolidation of such systems as a means for promoting sustainable development (Manzo and Lopez, 2011).

Development of local markets, as a tool for constructing sustainable rural development strategies is

not necessarily synonymous with reactionary localism or knee-jerk defense of local products and circuits without considering the complex relationships established between the local and global levels. At stake are the social construction of markets, institutional agreements and policy instruments capable of making visible new forms of production, consumption and land tenancy, as well as guaranteeing renovation over generations of ecological processes which sustain these activities (Job, 2011).

The importance of generating evidence of the role of peasant family farming is crucial because it contributes to knowledge of this type of local culture to raise consciousness regarding the crisis of the agricultural model borne of the green revolution. Data indicate that despite the fact that agribusiness controls the majority of arable land, especially that which is of the highest

quality, almost all nations currently have food thanks to peasants and family farming. For example, peasants of the world only manage 24.3% of agricultural land, nevertheless they produce close to 80% of all food (Via Campesina, 2011).

Chayote is a crop which has played an important role in families consumption and economy. Originally from Mesoamerica, one of the most genetically diverse areas, this crop is grown in a traditional manner in many regions of the world and is one of the vegetables which is most accessible to low income families (Saade, 1996; Alvarenga-Venutolo *et al.*, 2007).

In all of Mexico, this crop has become increasingly popular in past decades, due to its nutritional characteristics which make it one of the most widely consumed vegetable crops. In 2007, estimated national production of chayote was 100,452 ton⁻¹ with a value of 190,576,100 Mexican pesos (13 mexican pesos = 1 USD) and a national average yield of 57.66 ton ha⁻¹ (Soma and Nunez, 2013).

Despite this, little is known about local knowledge and strategies for marketing this crop. Therefore, the objective of this study was to analyze the relationship between the market and chayote production at the family level in two municipalities of the state of Chiapas, Mexico.

MATERIALS AND METHODS

Location: The study was carried out in the municipalities Villaflores and Villacorzo from June to December, 2012. The municipality Villaflores, Chiapas is located in the Frailesca 6 Economic Region of Chiapas to the North are the municipalities Ocozocoautla de Espinosa and Suchiapa to the East Chiapa de Corzo and Villacorzo to the South Villacorzo and Tonalá and to the West Arriaga and Jiquipilas (Fig. 1). The coordinates of the municipal seat are 16°14'01" North latitude and 93°16'00" West longitude with an altitude of 551 m above sea level (CEIEG, 2011).

The municipality Villacorzo is located in the Southeast of the state of Chiapas in what is geographically termed the Central Depression. It is also, part of the Frailesca 6 Economic Region. To the North are Villaflores and Chiapa de Corzo to the East Venustiano Carranza and La Concordia to the South Pijijiapan and to the West Tonalá (Fig. 1). The coordinates of the municipal seat are 16°11' 05' North latitude and 93°16' 03" West longitude with an altitude of 584 m above sea level (CEIEG, 2011).

Methodology: The methodology used is based on a socio-agronomic study (Guevara, 2007) rooted in ethno-agronomy and ethnobotany in order to gather and

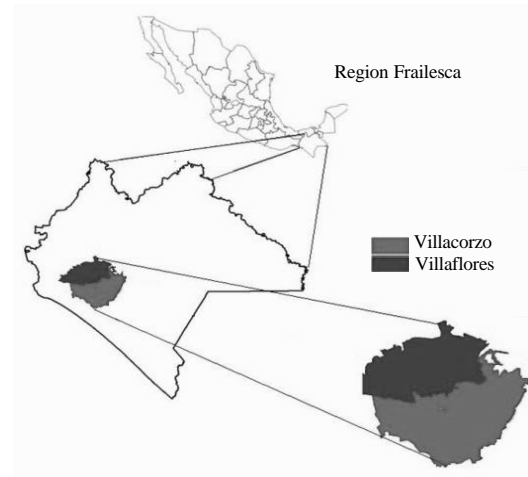


Fig. 1: Location of the municipalities Villaflores and Villacorzo, in Chiapas, Mexico

Table 1: Variables and indicators used to identify grower criteria for marketing chayote *S. edule* in the municipalities Villaflores and Villacorzo, Chiapas

Variables	Indicators
Manner in which the product is sold	Per kg Boxed Per unit
Type of sale	Formal established intermediaries Direct sales Both
Prices	Grower sets price Supply and demand Negotiated
Management of excess product	Given away Consumption Both
Means of promotion	Always sold Direct sales Direct purchase Both
Limiting factor regarding product presentation	Time Product quantity Knowledge Conditions Customs
Processing of product to provide value added	Grower is knowledgeable Grower lacks this knowledge

systematize traditional knowledge and the most important aspects of marketing chayote (Hernandez, 1985; Guerrero, 1995; Aleman *et al.*, 2001).

Through an ethnoagronomic field exploration, 30 chayote growers were located per municipality according to random exploratory routes from the center of each community toward the four cardinal directions. Structured interviews were applied to these growers based on criteria related to different indicators or components of the production system which were classified into 8 groups of variables for analysis (Table 1).

Statistical analysis: Analysis of results consisted of grouping and codifying answers and their interpretation based on percentages calculated for each indicator documented (Guevara, 2007). Data recorded in percentages was analyzed with Contingency Tables (Sanchez, 1989). Results are presented and based on the maximum number of growers identified during the ethno-agronomic exploration. Proportions for each variable studied are presented as follows:

- Percentage of growers with respect to the sample interviewed in each municipality
- Percentage of growers of each municipality with respect to the total interviewed in the two municipalities
- Percentage of growers of the two municipalities with respect to the total of both municipalities. Information was processed with the program STATISTICA (StatSoft. Inc., 2007)

RESULTS AND DISCUSSION

In the municipalities Villaflores and Villacorzo, chayote is most commonly marketed by unit followed by weight in kg, as shown in Fig. 2. The 50% of growers interviewed in both municipalities market chayote per unit, 23.3% by weight and 13.3% packed in boxes (Fig. 2).

In Villacorzo, the percentage of growers selling chayote per unit was 61.5%, greater than in Villaflores (41.2%). The same tendency occurred with respect to marketing by box (45-60 kg) or bulk sale.

Such marketing of agricultural products is typical of insertion of rural families in local markets and productive or value chains developed by farmers and consumers through mutual agreement. According to IICA (2010), insertion of small and medium scale growers in local or

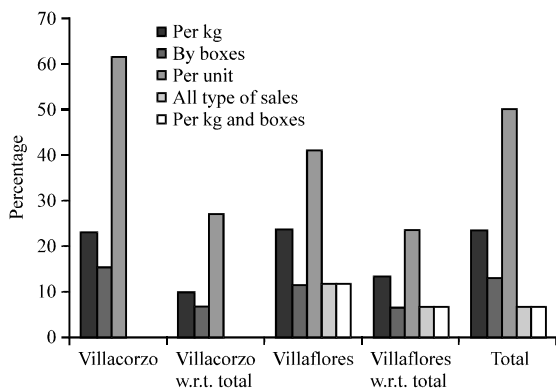


Fig. 2: Percentages of farmers growing chayote *S. edule* in rural communities in the municipalities Villaflores and Villacorzo, Chiapas; Sell with unit follows

export markets requires joint action of governments, the private sector and civil society. Governments should focus their efforts toward creating institutional and legal frameworks which favor such coordination and define priorities and strategies of budgeting and investment which strengthen farmers' capabilities. Furthermore, paternalistic and populist programs should be avoided.

Analysis of the destination of products sold in the market (formal established intermediaries) or directly on the farm shows that 64.0% of all families in both municipalities sell their products directly to the consumers from their homes, 32.0% use local markets (formal established intermediaries) and a only one grower combines direct sale with market sale. The tendency was similar for both municipalities (Fig. 3). In Villacorzo, 70% of families directly sell their products the rest sell through the formal intermediaries.

Unlike, the other variables analyzed, the manner in which prices are set was statistically different (contingency coefficient = 0.38, Pearson's $\chi^2 = 5.06$; $p = 0.07$) for each municipality (Fig. 4) which means that

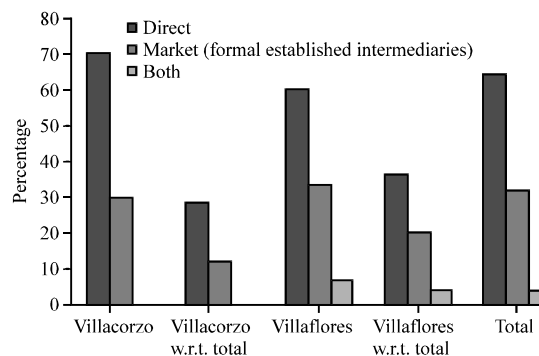


Fig. 3: Percentage of farmers growing chayote *S. edule* in rural communities in the municipalities Villaflores and Villacorzo, Chiapas; Direct sell

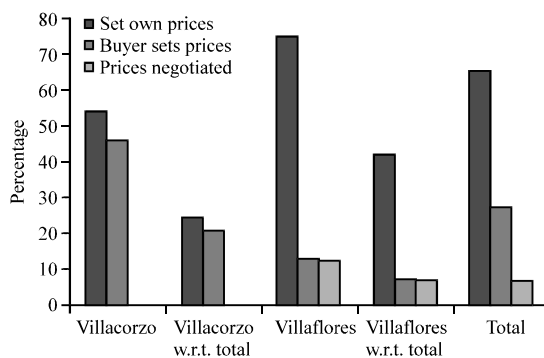


Fig. 4: Percentage of farmers growing chayote *S. edule* in rural communities in Chiapas

this commercial activity varies from one locality to another and probably respond to cultural patterns constructed from the relations between farmers and consumers. In general, 65.5% of farmers interviewed in both municipalities set prices, the 27.59% are set by buyers and only 6.9% are negotiated by the consumers.

Chayote prices on the Mexican national market vary greatly among the country's different wholesale market sites but generally remain constant throughout the year. Current prices in US supermarkets range from \$0.57-1.20 US dollars per kg fresh weight).

The proportion of families managing surplus production through consumption given away or a combination of both in the two municipalities is shown in Fig. 5. Of all families interviewed, 58.3% consume the surplus product, 20.8% say they always sell the entire harvest, 16.7% combine giving away with consumption and 4.17% give away their surplus product.

The previous data show that growing chayote proves to be a profitable option for rural areas of Mexico. Therefore, it is important to locate new potential regions where chayote may be produced, in order to increase exports and generate foreign exchange. It also implies demonstrating families contribution to local markets, therefore they should be taken into account in development strategies for agricultural markets. According to the IICA (2010), the United States Department of Agriculture (USDA) Agricultural Census, published in February, 2009, indicates that chayote sales in the United States has increased 48% from \$812 million US dollars in 2002 to \$1200 million in 2007. For this period, the number of American farmers growing chayote increased from 116,733-136,817.

The way in which products are promoted on a local level influences marketing effectiveness. Results show that chayote growers market their product by direct supply and demand, 69.2% directly offer their product while the chayote of another significant percentage of growers (23.0%) is demanded by consumers and the rest combine both marketing strategies (Fig. 6).

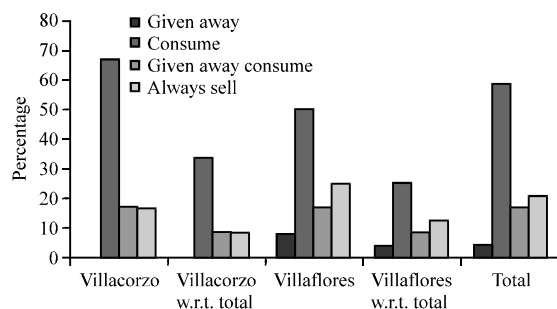


Fig. 5: Uses of excess production by farmers growing chayote *S. edule* in rural areas of the municipalities Villacorzo and Villaflores, Chiapas

Figure 7 and 8 summarize the manner in which growers present their product, as well as factors which limit such presentation. The majority of families interviewed state that two factors which most limit their ability to properly present their product are the quantity of chayote grown and lack of knowledge of how to

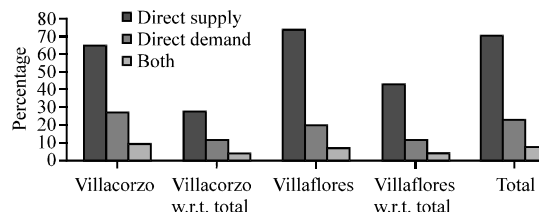


Fig. 6: Forms in which farmers growing chayote *S. edule* in rural areas of the municipalities Villaflores and Villacorzo, Chiapas promote their products

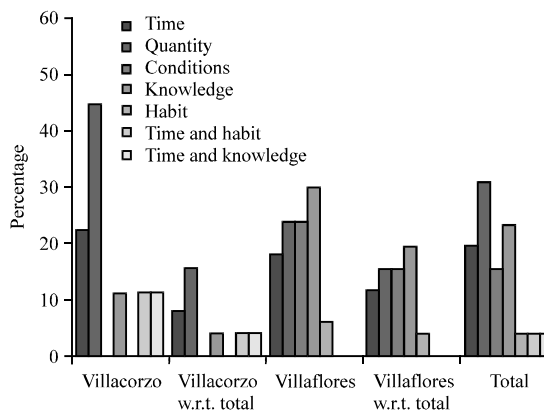


Fig. 7: Factors which limit adequate presentation of chayote *S. edule* for marketing, as a function of the percentage of growers interviewed in the municipalities Villaflores and Villacorzo, Chiapas

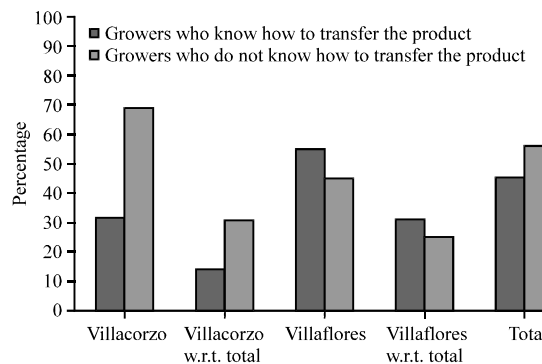


Fig. 8: Percentages of farmers growing chayote *S. edule* in the municipalities Villacorzo and Villaflores, Chiapas who state that they know how to process their products for marketing

adequately present it. To a lesser extent, families state that they lack the time to properly present their product (Fig. 7).

Another factor limiting adequate presentation of chayote is the knowledge necessary to provide value added to this product (Fig. 8), 55.5% of those interviewed stated that they did not know how to present the product in order to achieve better market relations with their clients. Nevertheless, in Villaflores, 55.0% of growers assure that they do know how to transform their product while in Villacorzo 31.2% of families growing chayote state that they know how to transform their product. In neither case did they specify how to do so.

These findings are very important for understanding the productive (value) chain of the chayote crop on a family level in rural areas, especially taking into account regional or international demands for commercial strategies. For example, in Honduras has been promoted the cultivation of chayote varieties which are attractive for export. In this sense, this crop has contributed somehow to development of the rural sector, upon creating 128 permanent jobs of which over 30 are filled by women (USAID, 2006).

Another example is the USAID (2006) which promoted a project through the Rural Economic Diversification Program. In 2005 participant producers, sold 380,000 pounds of chayote with sales of \$37,000 sterling pounds and by the end of 2006, sales had reached 1.8 million sterling pounds. It had also happened since US packing companies began to ship a new variety to Canada. Exports reached 3,840 pounds and additional orders were made. Post-harvest quality tests are being carried out to determine the capacity for export to Europe. One concern is the time required for the product to reach European markets. Therefore, it is important to study the ways to provide value added to production through healthy, safe preserves which guarantee greater durability of the product without compromising its natural qualities.

CONCLUSION

Local strategies and knowledge for marketing chayote on a family level in the municipalities Villaflores and Villacorzo of the state of Chiapas, Mexico are based on different variables which characterize market relations of the productive chain through indicators whose percentages vary among growers and in some cases among municipalities. Chayote is an important source of income for rural families of Villaflores and Villacorzo and market relations are established upon direct sales of over 60% of production to the final consumer. The remaining product is sold in local markets or formal established intermediaries. Total 69% offer their product directly, while at least one third of growers interviewed say that their product is demanded directly by consumers at prices

established by the majority of producers (65.5%). The 58.3% of growers consume excess production which is not sold. Nevertheless, despite the demand and commercial value of chayote in the municipalities studied, 55.5% of growers lack sufficient knowledge to provide added value to their product through improvement in the manner of presentation in markets or seeking other uses, such as in animal feed as a cheap, easily obtainable carbohydrate and fiber supplement.

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