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Analysis of Barriers to Development of Malagasy Horticultural Microenterprises in Madagascar

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Academic Editors: Varit Srilaong, Mantana Buanong, Chalermchai Wongs-Aree, Sirichai Kanlayanarat and Douglas D. Archbold

Received: 1 December 2015; Accepted: 10 May 2016; Published: 30 December 2016

Abstract: The malagasy rural environment and the development of agricultural microenterprises are closely linked. For Ambalavao Atsimondrano located in the suburban area of Antananarivo, Madagascar, the horticultural chain appears as a buoyant sector; many rural or urban households are dependent upon it. Despite the reputation of the region in this field and support from different organizations, Rural Microenterprises (RMEs) encounter problems in their development. This study highlights the factors blocking entrepreneurial development including education of horticultural entrepreneurs and their ability to deal with complex situations. The aim of the study was to identify the factors affecting the growth of RMEs. A focus group on 33 small farmers considered as RMEs was conducted taking into account their individual characteristics. A typology and value chain analysis resulted in their classification and in comprehension of their empowerment in management. The results indicated that there were 3 types of entrepreneurs or promoters: the experienced traditional (36%), the educated young (33%), and the professional young (31%). Ishikawa diagrams highlight the problems related to entrepreneurial development in funding and information systems. Our conclusions insist on the necessity of improving communications strategies among microentrepreneurs, guidance for entering the market, and professionalizing the horticultural trade, while emphasizing the importance of cooperation between producers.

Keywords: horticulture; entrepreneurship initiative; entrepreneur's education; cluster analysis

1. Introduction

In Madagascar, the primary sector of 2.4 million agricultural households indicates 300,000 rural young farmers joining the labour market each year [1]. While the illiteracy rate has been less than 20% in urban areas in the last 15 years, it is 36% in rural populations and only 10% of them continue beyond elementary school [2]. In the study area located in the rural municipality of Ambalavao, District of Atsimondrano, Region Analamanga, Madagascar, a multitude of Rural Microenterprises (RMEs) created by smallholder farmers operate in all rural activities. Youths and adults are looking for livelihoods. Thus, they are forced to be entrepreneurs, but the majority have not been educated to be successful.

Despite the large workforce of the district, 372,077 inhabitants in 2012, it has failed to increase its agricultural productivity. Although farmers have a huge agricultural and craftsmanship potential, they are slow to make progress [3]. Facing this difficulty, the aim of this research was to identify and explain the factors influencing performance, and the underperformance, of RMEs. The specific goals

were: (i) to classify the different characteristics of horticultural microentrepreneurs; (ii) to evaluate RMEs' management levels; and (iii) to define influences of organizations and institutions in the horticultural fields.

2. Experimental Section

2.1. Materials

2.1.1. Site

The municipalities of Ambalavao, Ankadinandriana, and Anjeva are located in the southern and in the eastern parts, respectively, of the suburban area of Antananarivo, Madagascar. They are among Antananarivo's suppliers (Figure 1), but the survey was focused on Ambalavao.



Figure 1. Map of Antananarivo suburban area.

Ambalavao has 2540 ha of land suitable for cultivation, but only 57% is exploited [4]. The RMEs in this area are specialized in raphia weaving, and among horticultural crops are mainly involved in the production of pineapple, strawberry, and ornamental plants and nurseries [3].

2.1.2. Data Collection

Data were collected in two steps: (i) in order to get an overview of RMEs, some discussions were held with PROSPERER s (PROSPERER (Programme de Soutien aux Pôles des Microentreprises Rurales et aux économies Régionales) is a program funded by IFAD in 2008 for a 7 years duration) agents and senior managers, and with the municipality's mayor; and then, (ii) data from a focus group of 33 horticultural farmers spread across 3 points of sale alongside the 7th National Road were collected. Most of analyses were based on qualitative data.

2.2. Methods

2.2.1. Microentrepreneur Characterization

The collected data focused on education, socioeconomic surroundings, experience, innovation, creativity, and entrepreneurial culture of the surveyed. Data analysis and their processing occurred in 3 steps: (i) a classification for identifying types of farmers by Agglomerative Hierarchical Clustering (AHC); (ii) reduction of the variables by Discriminant Analysis (DA) to confirm the results of Agglomerative Hierarchical Clustering (AHC); and (iii) identification of the characteristics of each class by Multiple Correspondence Analysis (MCA).

For step 1, a scoring model was necessary in order to codify the results. Selected variables and their importance on a 1 to 5 scale were used (Table 1), and the variables were codified (Table 2). The higher the score of a variable, the more significant was the variable. The variables studied were:

Duration of practice: the years increase in intervals of five.

Education: taking into account illiteracy until or beyond secondary school.

Management: considers on the one hand the farming system and the time involved, and on the other hand, if the main activity is formal or informal; for example, part-time versus informal full time farming.

Innovation: creativity, marketing and communication strategies.

Finance: if a member of a microfinance institution (MFI) and the level of capitalization.

Supply: if difficult, moderately difficult, or easy.

Infrastructure: based on the selling point quality.

Market level vulnerability to economic crisis; may be high, medium or low.

Table 1. Variable scoring.

Variables	Score				
	1	2	3	4	5
Duration of practice (years)	5 to 9	10 to 14	15 to 19	20 to 24	>25
Education	illiterate	Elementary school	Elementary school level 2	Elementary school level 3	more
Management	part-time farming/informal/seasonal	part-time farming/informal/full year	Main activity Informal/full year	Main activity/formal/full year	
Innovation	Tough competition/traditional/without market strategy	Average creativity skills/communication strategy	Good packaging/niche strategy		
Finance	MFI aversion/Low capitalisation	MFI aversion/ medium capitalization	Possible member/ medium capitalization	MFI member/ large capitalization	
Supply	Hard	Medium	Easy		
Infrastructure	Market stall	Wooden house	Market pavilion		
Market level vulnerability to economic crisis	High vulnerability	Medium vulnerability	Low vulnerability		

Table 2. Variable codification.

Variables	Score				
	1	2	3	4	5
Duration of practice (years)	year-1	year-2	year-3	year-4	year-5
Education	education-1	education-2	education-3	education-4	education-5
Management	management-1	management-2	management-3	management-4	
Innovation	innovation-1	innovation-2	innovation-3		
Finance	finance-1	finance-2	finance-3	finance-4	
Supply	supply-1	supply-2	supply-3		
Infrastructure	infrastructure-1	infrastructure-2	infrastructure-3		
Market level vulnerability to economic crisis	market-1	market-2	market-3		

2.2.2. Assessment of the Importance of Management of RMEs

The goal was to prioritize the outlines of the blocking system. Then, an Ishikawa diagram was created by brainstorming with PROSPERER's agents in the *Atsimondrano* and *Avaradrano* districts. Generally, in agricultural fields, causes are categorized into 5 families (5M Methods), but the fish bone diagram adopted considers 6M Methods (Material, Machine, Method, Measurement, Man Power, and Environment for *Milieu*). Respectively, they are presented as follow:

1. Material: consumables, raw materials, documents and information, etc.
2. Machine: requires investment such as equipment, telephones, etc.
3. Method: organization, working methods, procedures, system and operating methods, law, regulations, specifications, etc.
4. Milieu (environment): work environment, working conditions, light, noise, temperature, pathogens, etc.
5. Man power: human activity, behavior, skills, work habits, management, staff, experience, etc.
6. Measurement (financial means): budget and price.

The resulting diagram shows a problem tree of the development of microenterprises.

2.2.3. The Influence of Organizations and A Horticultural RMEs' Level

According to the International Labor Organization's approach [5], the research focused on the different institutions belonging to the production chain. In addition, the analysis of the value chain allowed an understanding of the connection between horticultural producers as well as the opportunities and constraints that result from such connection. A map of the value chain was built. In each step of the chain, the support organizations were cited.

2.3. Data Analysis

Data were analyzed using XLSTATTM 2008 software manufactured by Addinsoft.

3. Results and Discussion

3.1. Individual Characteristics of Horticultural Entrepreneurs

3.1.1. Characteristics of Each Class

AHC led to three types of entrepreneurs, reclassified with discriminant analysis (Figure 2).

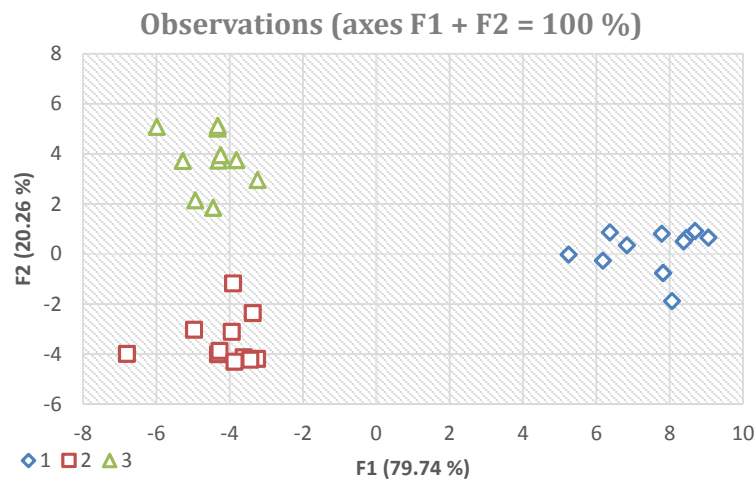


Figure 2. Entrepreneur/promoter classification based on discriminant analysis: Types 1, 2, and 3.

About 79.74% of the variability was explained by axis F1, while 20% of the variability was explained by axis F2. The promoters characteristics included the experienced traditional (Type 1; 36%), the educated young (Type 2; 37%), and the young professional promoters (Type 3; 31%) (Table 3).

Table 3. Entrepreneurs/promoters characteristics.

Type	1	2	3
Name	Experienced Traditional Promoter	Educated young Promoter	Professional young Promoter
Workforce (effectif)	12	11	10
Proportion (%)	36	33	31
Experience	High	Medium	High
Education	Elementary school	Elementary school level 2	Elementary school
Management	Informal and main activity	Member of cooperatives and main activity	Informal and part-time farming
Innovation	Medium	Medium	Low
Finance	Not member of microfinance with low capitalization	Member of microfinance and medium capitalization	Not member of microfinance with low capitalization
Supply	Very easy	Medium	Easy
Infrastructure	Depends on program supports	Depends on program supports	Depends on program supports
Market	Medium vulnerability to socio-economic crisis		Low vulnerability to socio-economic crisis

Type 1: Experienced traditional promoters were characterized by a long period of practice (>20 years); they were represented by year-4 and year-5. The individuals of this type had a good strategy (supply-3) and a solid resilience facing possible crises (market-3). However, these individuals were poorly educated (education-1) with low innovation skills (Innovation-1). They had a microfinance aversion (finance-1), and they operated in informal situations (management-1).

Type 2: Educated young promoters were the opposite of the Type 1. They were characterized by a relatively high level of education (education-4 and education-5). They had high innovation and management ability, represented, respectively, by (innovation-3) and (management-3). They were members of microfinance enterprises (finance-3) and were quite sensitive to market fluctuations (market-1) (Figure 3). Their lack of experience (<10 years) (year-1) was noted.

Type 3: Professional young entrepreneurs were an intermediate class between the two previous types (Figure 3). Nevertheless, they were much closer to Type 1 by their low innovation capacity

(innovation-2) linked with their low education (education-2). They had strong reinvestment ability. They were not members of rural organizations (management-2). However, they were members of microfinance enterprises (finance-4). Their feature in common with Type-2 was the short duration of activities.

The 3 types of promoters obtained from the Multiple Correspondence Analysis graphic were considered as supplementary variables and were framed. The remaining variables were their characteristics. If they were closed, the promoters' features were identified by associating them with these remaining variables (Figure 3).

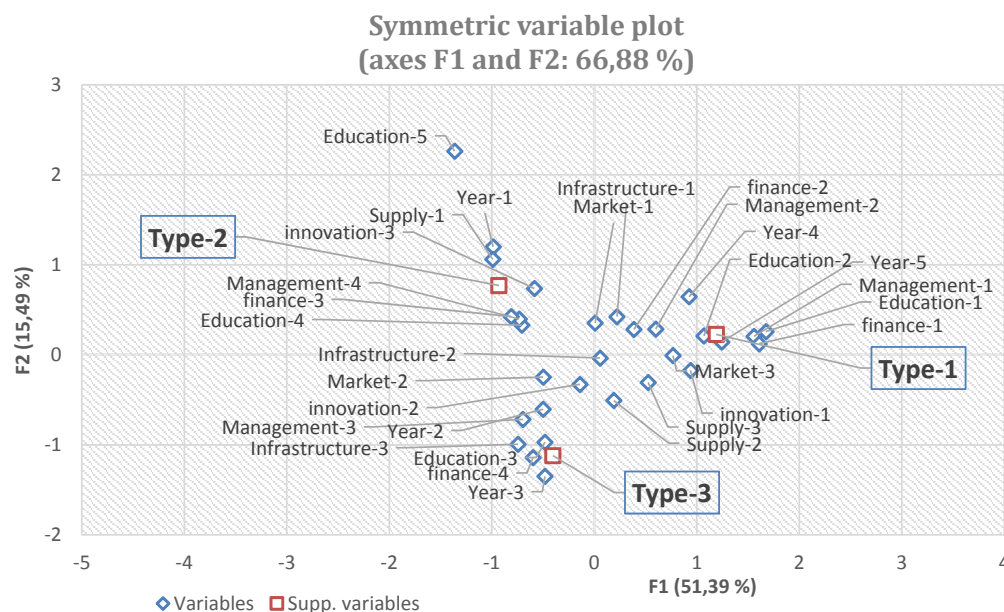


Figure 3. RMEs' features by multiple correspondence analysis.

3.1.2. RMEs' Analysis Axes

The analysis of each type of promoter was performed on the basis of education, experience, innovation and creativity (Table 2).

Education: Education is the basis of sustainable development [6]. It is an essential tool for evolving values and attitudes, abilities, behaviors and life styles. Type 2 was the most receptive; they can easily get a strong entrepreneurial culture.

Experience: Work experiences can be earned as a salaried employee or as a manager. Moreover, theoretical conceptions distinguish vocational training from experience which is more important; it makes managers at ease in task accomplishment [7]. Type 1 is the most experienced promoter; their experience helps them identify and assess the importance of their decision criteria [8]. So, their experience explains their solid resilience facing market crises.

Innovation and creativity: Creativity results from the application of new ideas linked to innovation [9]. The young educated (type 2) and the young vocational are characterized by higher innovation and creative abilities.

Entrepreneurial culture: FORTIN [10] asserts that entrepreneurial culture is the antidote against poverty. Here, all promoters have a desire to start a business. Though the Type 2 and the Type 3 as members in Microfinance Institutions (MFIs) have more opportunities, the Type 2 is the most able to expand their activities by exploiting the networks of farmers' organizations where they work.

3.2. The Horticultural Microenterprise Management

The aforementioned results hinder the development of RMEs. The Ishikawa diagram outlines the factors blocking RMEs (Figure 4), and Figure 5 shows the assessed elements for each variable.

1. Material. Among the identified materials, packaging remains the main issue of RMEs (51%).
2. Machine. In order to add value to their product, microenterprises face constraints concerning the organization of locales (46%) and the creation of infrastructures (39%). During the brainstorming, the access to water was also raised as a major issue (15%).
3. Methods. Microenterprises fail to assure their visibility. Moreover, the Government has yet to establish a RME policy.
4. Milieu (environment): Seasonality may have an impact on supply. Farmer organizations and market operators are competing.
5. Manpower. The low education level of the entrepreneurs is negatively impacting their entrepreneurial culture and their management skills. In addition, some weaknesses include the supervision, innovation, and creativity.
6. Measurement (financial means). They include external and internal financial difficulties. For external difficulties, the majority of microenterprises cannot support the high interest rates of MFI, and there are delays in the release of funds. Internal difficulties are the culture of savings leading to the lack of reinvestment.

Considering these variables, the problems cited by the RMEs were mainly financial means (82%), materials (76%), Method (18%), and Environment (24%) (Figure 6).

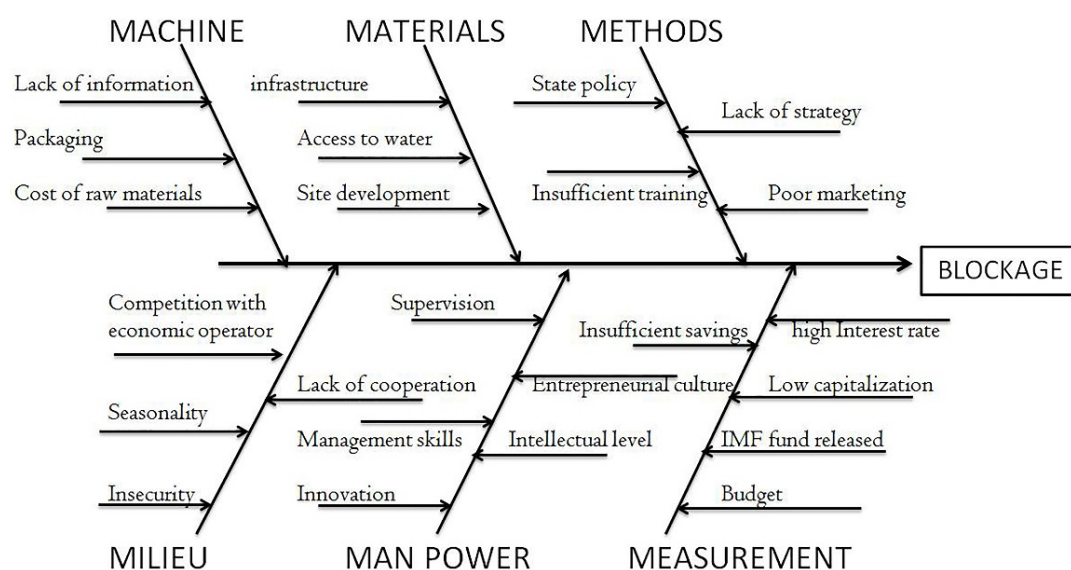


Figure 4. Ishikawa diagram.

Each main problem was comprised of associated problems. The whole constituted the blocking factor in the development of RMEs (Figure 5). As a synthesis, the RMEs' main problems were the Machine and the Measurement. So, they are common problems of the horticulturalists. Milieu and Methods seem to be tolerable in comparison to the others (Figure 6).

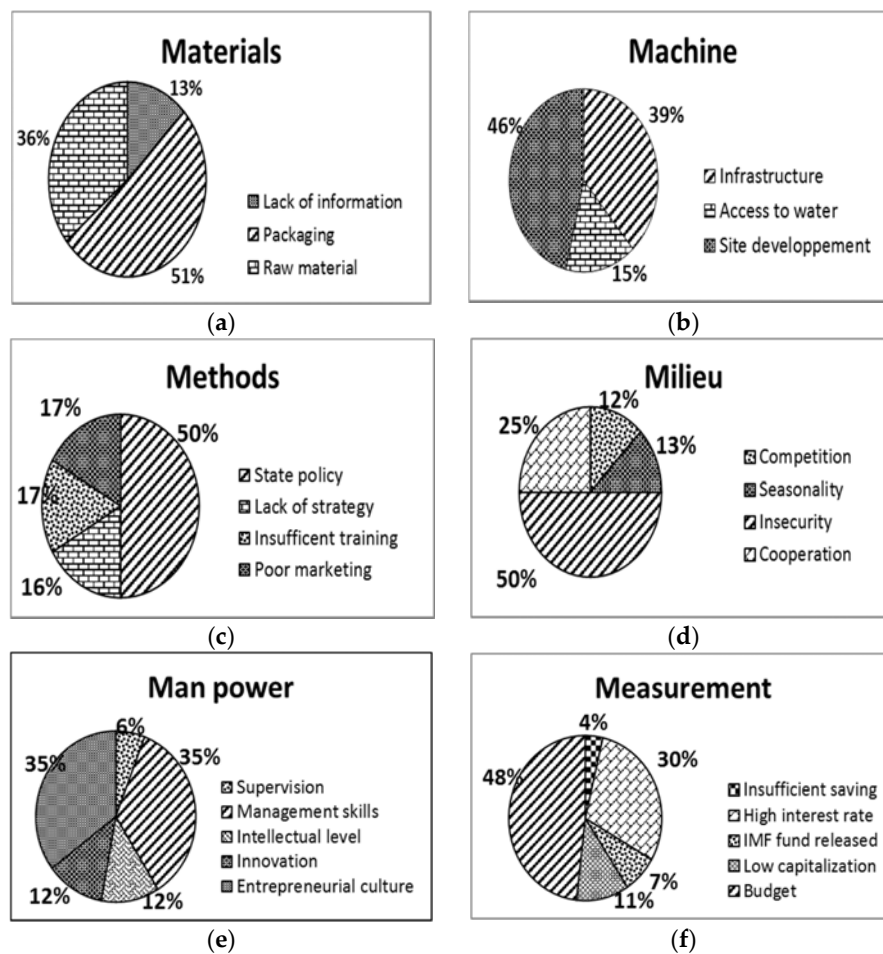


Figure 5. Detailed problems of RMEs.

Percentage of RME by 6M

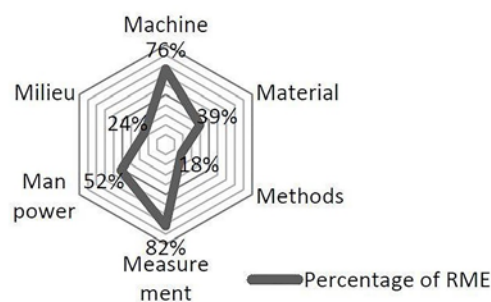


Figure 6. The primary problems for RMEs.

3.3. Institutions and Organism for Horticultural Sector Development

3.3.1. Value Chain

The public and private institutions considered as facilitators shared the same goal: develop the horticultural sector through support services (Figure 7). The facilitators were PROSPERER, MFI, Enterprise Advisor (CE), Municipality, Chamber of Commerce, Industry of Antananarivo (CCIA), and Telecom Malagasy (TELMA). PROSPERER supports microenterprises by providing infrastructure and facilitates the creation of agricultural cooperatives, by access to MFIs for RMEs to resolve gaps in

cash flow and investment problems. It closely works with CCIA and CE as their interface for their know-how. CCIA is hosting PROSPERER, and CEs are service providers.

1. Supply. The seed suppliers sell inputs to the farmers. In parallel, horticulturalists may be self-sufficient. The facilitators are the MFI and CE which are PROSPERER's partners. MFIs contribute to the financial support of RMEs including the purchase of inputs, tools and related materials. The CE supports the choice of strategies and methods for approaching suppliers.
2. Production. Production mainly concerns RMEs, cooperatives and individual farmers. There are horticultural fields and seedling nurseries.
3. Processing. One part of the raw plant material may be sold directly by retailers or dealers. The remainder is processed for packaging.
4. Trading. This is the final step of the value chain. Market operators and retailers are those who work the most in the marketing of flowers and seedlings. They are closely linked to RMEs which are their suppliers. The products are intended for the urban market.

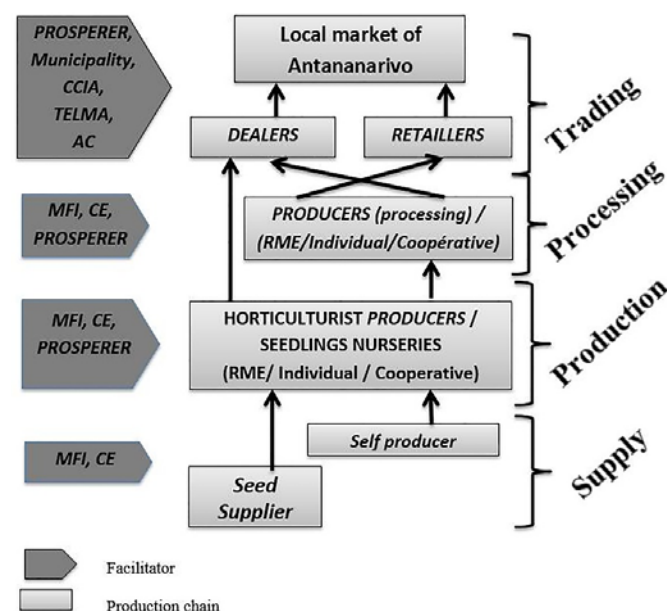


Figure 7. Value chain process.

3.3.2. Flow Map of Major Floral Crops

Figure 8 illustrates the flows of 3 types of flowers on the market in Antananarivo center and in the surroundings. Most flowers are intended for decoration rather than for crops or gardening. Farmers sell a variety of horticultural products, but *Pinus pinaster*, *Clarkia amoena*, and *Dianthus caryophyllus* are the flagship products. They are usually sold in bunches, reflecting consumer choice. The most productive period is between June and September. Daily average sales reach 4 bouquets per operator.

For *Pinus pinaster*, the majority of production comes from the rural municipality of Ambalavao and Tsiafahy. Indeed, its sales period peaked during reforestation campaigns between January and March. At a unit price of 400 ariary, a single point of sale in these 2 municipalities can provide 10,000 plants ordered a day in advance. Consumers make their purchases directly from producers in the municipality or from dealers.

For *Clarkia amoena*, production comes from the Anjeva municipality. This kind of flower were sold by bunch and one of them costs 1000 ariary. Producers make a wholesale daily delivery in the capital around 3 a.m. in the neighborhood of Anosibe, where traders from Anosy, Ivandry and Ampandrana, the three major selling points in the city of Antananarivo, buy their supply. They account for 50, 20, and 10 operators, respectively.

For *Dianthus caryophyllus*, the primary production comes from Ankadinandriana municipality. A bouquet of *Dianthus caryophyllus* costs 2000 ariary.

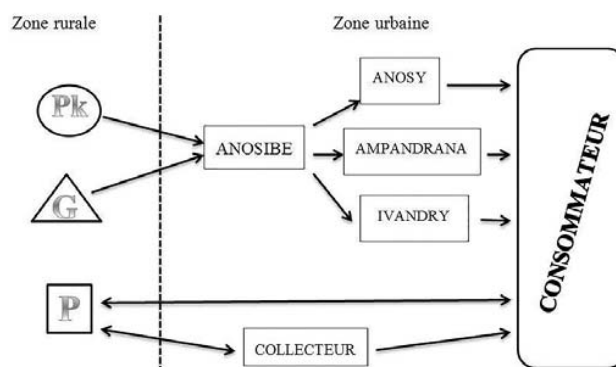


Figure 8. Flow map of floral crops in Antananarivo center and in the surroundings.

4. Conclusions

Rural microentreprises should put the focus on the restructuring of the trade system and should improve cooperation between producers. Future prospects must strengthen the profession. Pouillaude's conclusion [11], that an interactive policy of the government for the promotion of RMEs, is mandatory, the economic and social environment having a significant impact throughout the life of the RME.

Author Contributions: This work was a product of the combined effort of all authors. Tamby Misaina Ramanankonenana performed the experiments, gathered and analyzed the data, and wrote the manuscript. Romaine Ramanarivo, Sylvain Ramanarivo and Jules Razafarijaona revised and improved the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

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