Project FAO/TCP/SEY/6712(T)

Agricultural Survey and Database Development in Seychelles

SURVEY RESULTS

February 2000

Table of contents

🕮 1. Overview and historical background

A group of 115 islands or so, covering an area of 453 sq. Km in the Indian Ocean, the Seychelles archipelago is spread over an Exclusive Economic Zone of 1 000 000 sq. Km.

Represented by a few dots on the Map of the Word, and only few degrees south of the Equator, the Seychelles Islands are quite literally, a thousand miles from anywhere.

Of the islands, thirty-two are granitic, of rugged rocky format with hills rising as high as 905 meters.

These islands can be divided into four groups:

- Mahe and its satellites;
- Praslin and its satellites;
- Silhouette and North Island;
- And Fregate and its satellites.

Mahe, the largest island, occupies 143 sq. Km. the coral islands, which are smaller, cover a total area of 210 sq. Km.

Mahe lays 1 800 Km from East of Mombassa, 3 300 Km South - East of Bombay, and 1 100 Km North of Madagascar. It is 27 Km long and 12 Km large.

Seychelles has a tropical climate with a little variation in temperature throughout the year. There are two seasons, hot from December to May and cooler from June to November. The following figures are the annual average:

- Mean Maximum Temperature: 29.9^0 C;
- Mean Minimum Temperature: 24.5^0C;
- Humidity 80%;
- Sunshine Hours per day: 6.9 hours
- Rainfall: 2 285 mm.

The total population is estimated currently at 75 000, located mainly in Mahe and Praslin/La Digue. About 309 households are involved in agricultural activities, 113 in livestock production. The agricultural activities are concentrated in Mahe and Praslin/La Digue. The main crops cultivated are vegetables and fruits and root crops. For the survey purpose, the agricultural zone was divided into six regions:

- Mahe Central;
- Mahe North;
- Mahe South;

- Mahe East
- Mahe West;
- Praslin/La Digue.

The only of national important agricultural survey was carried out in 1978; the Central Statistical Office, today called Management and Information Systems Division (MISD), exclusively executed the exercise. Staff from Department of Agriculture were not directly involved enough.

📖 2. Objective of the survey.

The objective of the project was to provide key data to assess the present state of the agricultural sector, and to provide benchmark data for the ongoing statistical system, notably:

- the nature, the availability and source of farm inputs;
- the location, area and ownership of farmland;
- the distribution of cultivation techniques;
- the demographic and socio-economic status of farming households;
- the training background of farmers;
- the soil types;
- the number of farmers involved in the breeding of pigs, goats, chickens and cattle;
- The labour force in the agriculture;
- The farm management;
- The technique of irrigation;
- The access of farmers to various utilities such as treated water, electricity, road;
- The type of farming activity

📖 3. Summary of the methodology.

3.1 Universe of the study

Geographically, the survey covered the Islands involved in agricultural or livestock activities, namely Mahe, and Praslin/Ladigue. Regarding the statistic units to be enumerated, the survey covered both small and large-scale farms.

3.2 Method of data collection.

The first idea was to carry out a sampling survey, but after the construction of the sapling frame, it was found out that only three hundred households or so are involved in agricultural or livestock activities. It was then been decided to carry out the survey on complete enumeration basis.

The survey was conducted from June to August 1998. It was implemented through personal visits to each farm, where the enumerators completed the questionnaires based on the respondent's answers. In all cases the farm owner was approached to fill the questionnaire. Where the farm owner was not available, the farm manager was approached.

3. 3 Quality of the information collected

The response rate was rather poor, and this can be seen in the number of not stated cases, sometimes more than 50%(see frequency tables in the annex). This is a result of poor supervision of the field survey. Furthermore all data collected was based on the farmer's responses, and no additional objective measures were undertaken, for example of the size of the farm.

3.4 Data Processing.

The data entry was made using FoxPro and the tabulation using SPSSWIN. Hundred of frequency cross tabulation tables was produced (see annexes).

3.5 Dissemination of the results.

A database was produced using Access and is available at the Statistic Unit of the Planning Section in the Ministry of Agriculture. An HTM file was created, for the publication on the INTERNET if required. The author of this report did not have enough time for further dissemination.

4. Classical Analysis

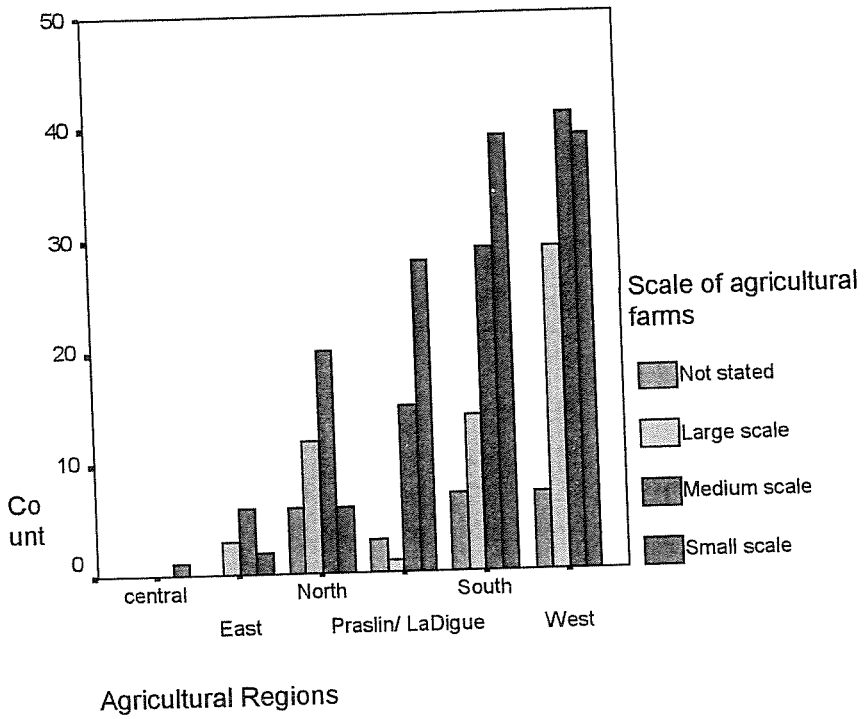
4.1 Spatial location of farms.

Three hundred nine farms had been enumerated, out of which fifty-nine large-scale farms, 112 medium scale farms and 115 small-scale farms. **87.3% of farmers are registered with the Ministry of Agriculture.**

Farms are located mainly in the West (37.54%), the South (29.12%), Praslin/Ladigue (15.25%), and in the North (14.23%).

Large-scale farms are located in the West (49.15%) and in the South (23.72%).

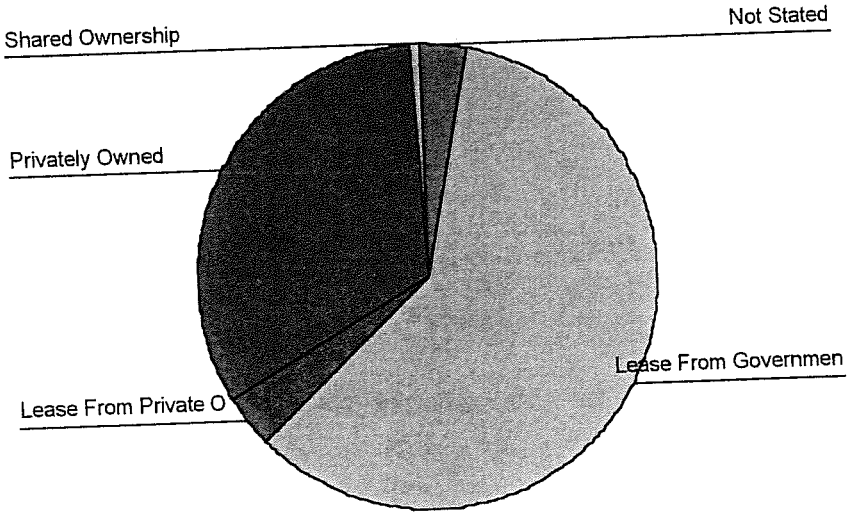
Small scale farms represent 37.2 % of the total number of farms and are located mainly in the West (33.9%), in the South (33.9%) and in Praslin /La Digue (24.34%).



4.2 Land tenure

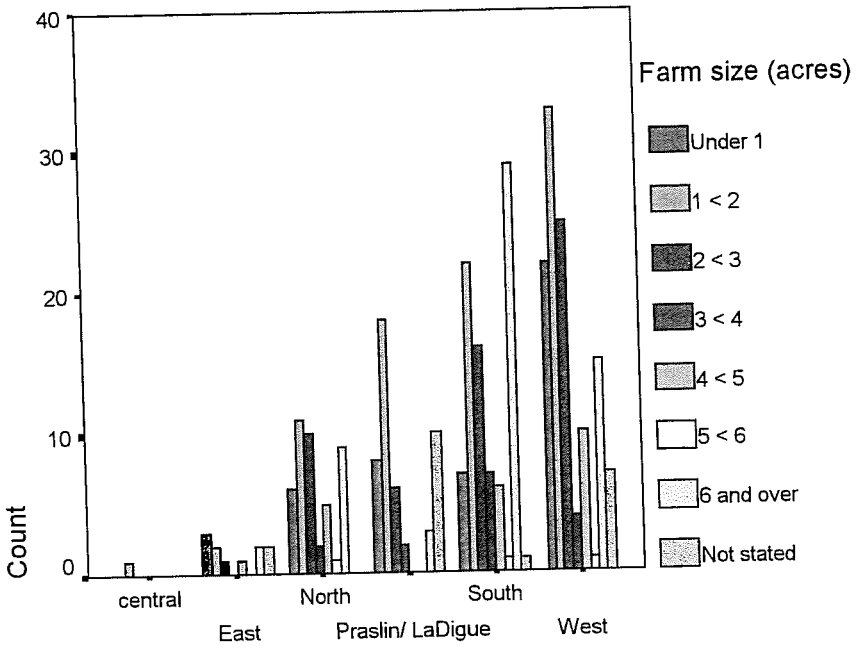
59.9% of farmers lease their farms from Government, while 3.6% lease from private owners. Only 32.7% of farmers are owners of their farms. Most of farmers leasing from Government are located in the West (41.6%), in the South (23.78%) and in Praslin/Ladigue (20.5%). Most of privately owned farmers are located in the same regions.

Property Ownership Pie Chart

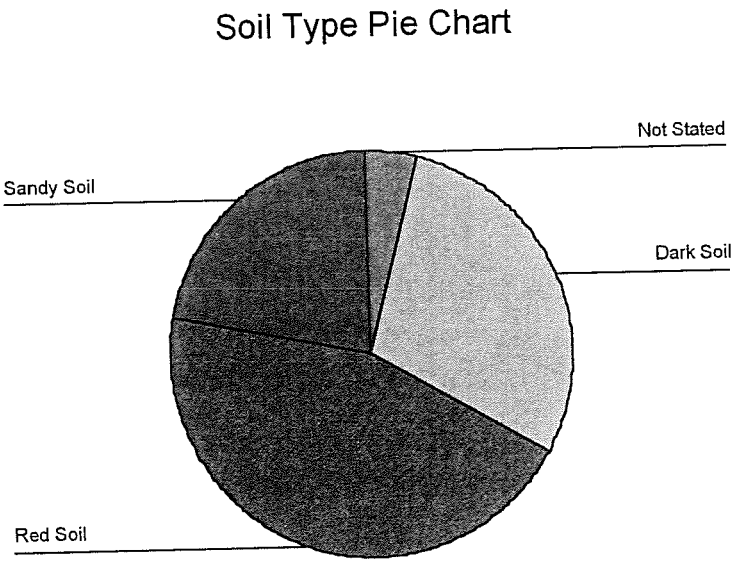


4.3 Farm size

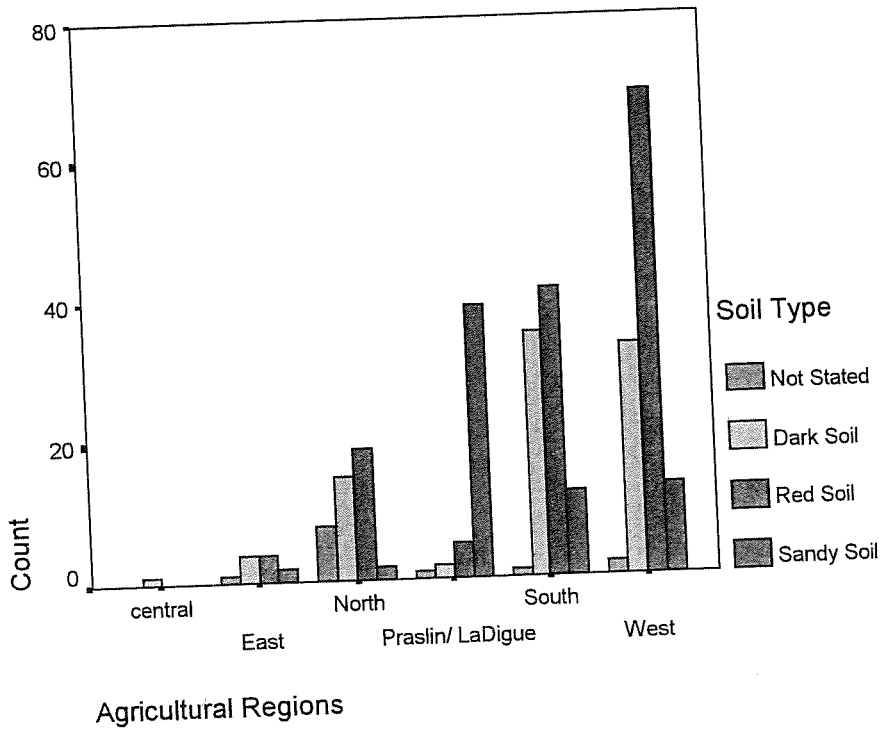
61.8% of farms are less than three acres, 12.9% between three and six acres and 18.77% more than six acres. The largest farms are located in the South ((50%) and in the West (25.8%). The smallest farms are located in the West (47.8%).



4.4 **Soil types and land topology.**



44.66% of farms are located on red soil while 29.12% are located on dark soil and 22% on sandy soil. Sandy soil is mainly found in Praslin/La Digue (57.3%) while dark and red soils are found in the West and in the South regions.



35.9% of farmlands are hilly terraced, 23.6% hilly not terraced and 34.6% flat.

4.5 Age distribution of farmers

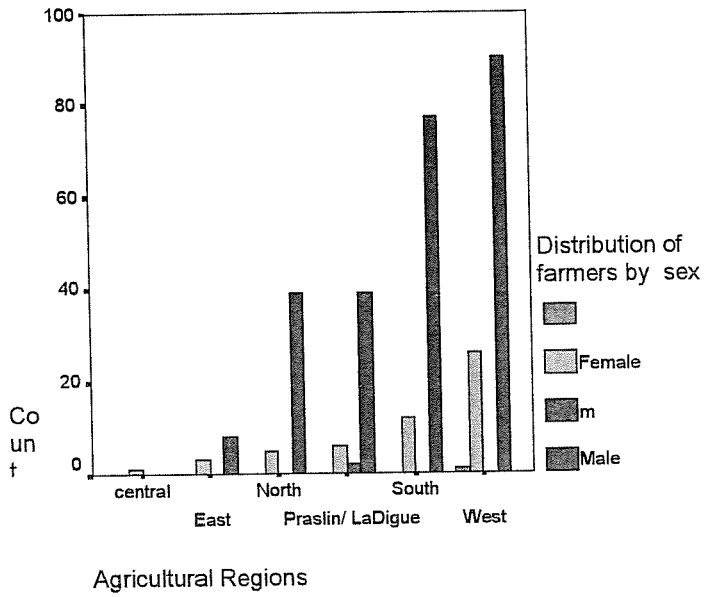
The age of farmers in Seychelles ranges from 19 to 73 years old. The ages of farmers are categorized into the following groups:

- 18-35 years: Young farmers
- 36-50 years: middle farmers
- 51-62 years: farmers approaching retirement age
- 63 years and over: farmers continuing after retirement.

Young farmers (aged up to thirty five years) constitute 27% of farmers, while 40% 0f farmers are aged over fifty. On a national level 88% of all farmers do so on a full time basis, while12% farm on a part time basis.

4.6. Sex distribution of farmers

Spatial distribution of farmers per sex is given in below.



Women comprise 14.2% of all farmers, compared to men that make up 85.8%. The largest proportion of women farmers is found in 51 to 62 years age category, comprising 23% of farmers in this group. Women also comprise 20% of aged 63 and over, i.e. post retirement age. Farming seems less popular amongst younger women. Amongst 18 to 35 year old women make up only 6% of farmers and 12% of the 36 to 50 year group

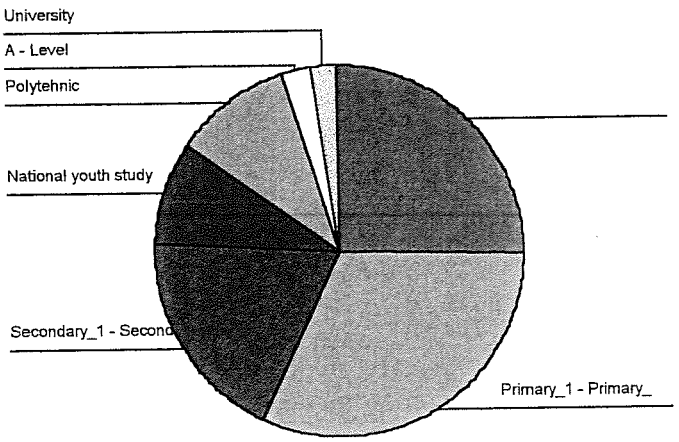
4.7. Education level of farmers

25.2% of farmers are not educated, while 2.3% have university level of education. 32% of farmers have attended primary school and 18.4% the secondary school.

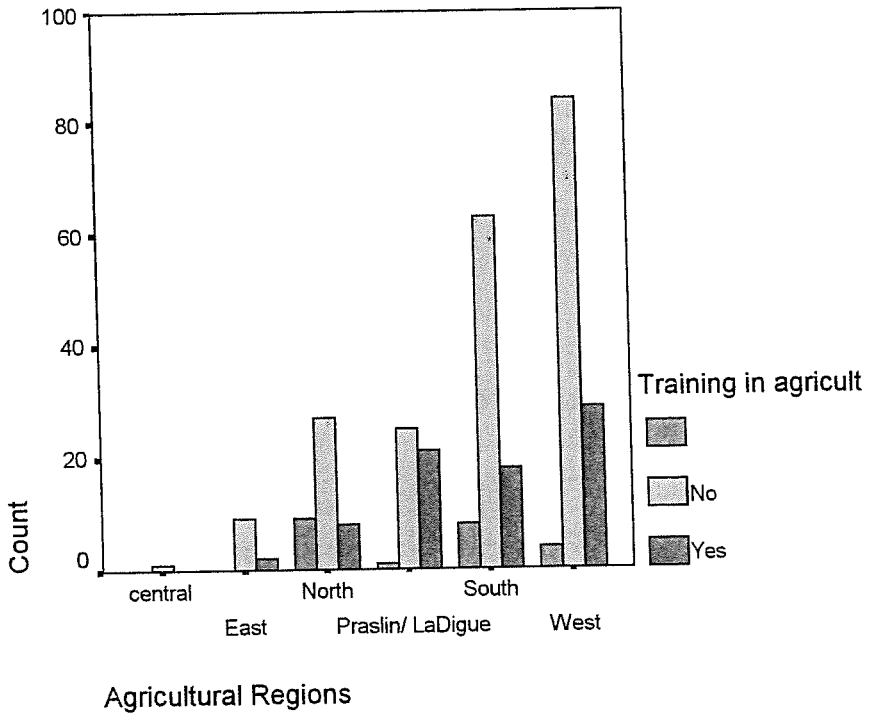
19.1% of farmers were trained in Agricultural Institution, out of which 1.6 in England, 10% in A.D.C, MAMR and 5.5% in the School of Agriculture (Poly), Anse Boileau.

5.3% of farmers were trained in other fields, out of which 1.9% in the School of Construction, 1% in the School of Art & Design, and 1% in Technical School.

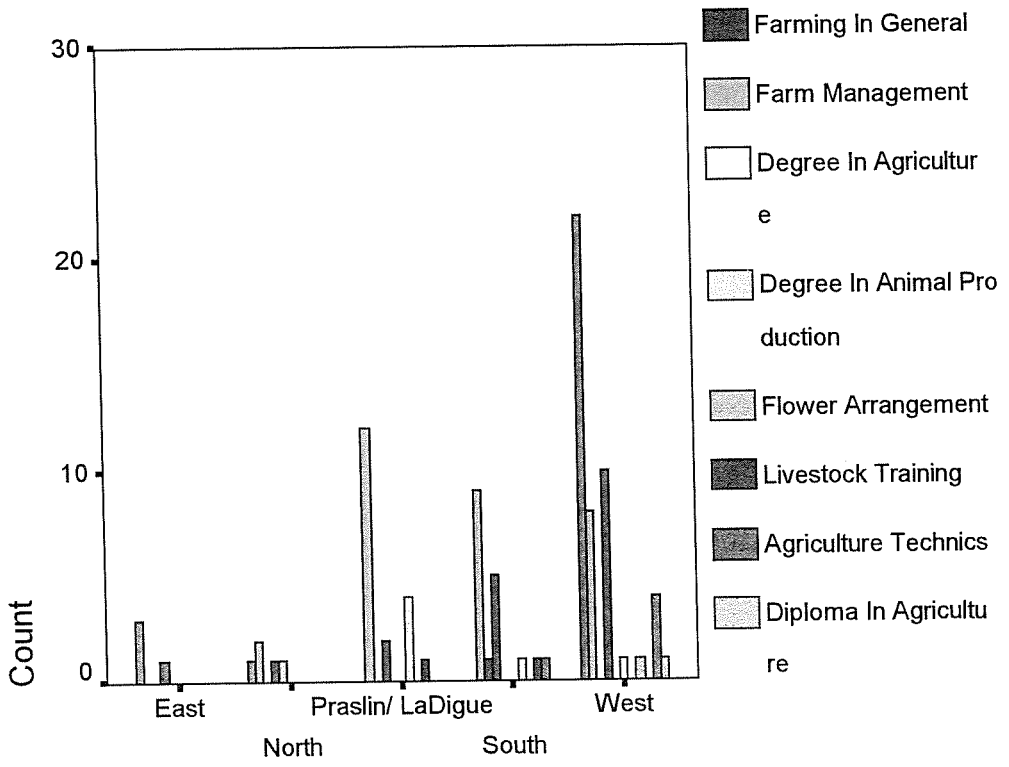
Education level of the agricultural holder Pie Chart



37.17% of farmers trained in Agriculture are located in the West region, while 23% of them are located in the South region. 74.6% of farmers trained in other field are located in the West, the South and in Praslin/La Digue.



The chart below gives the type of training received per geographical region.

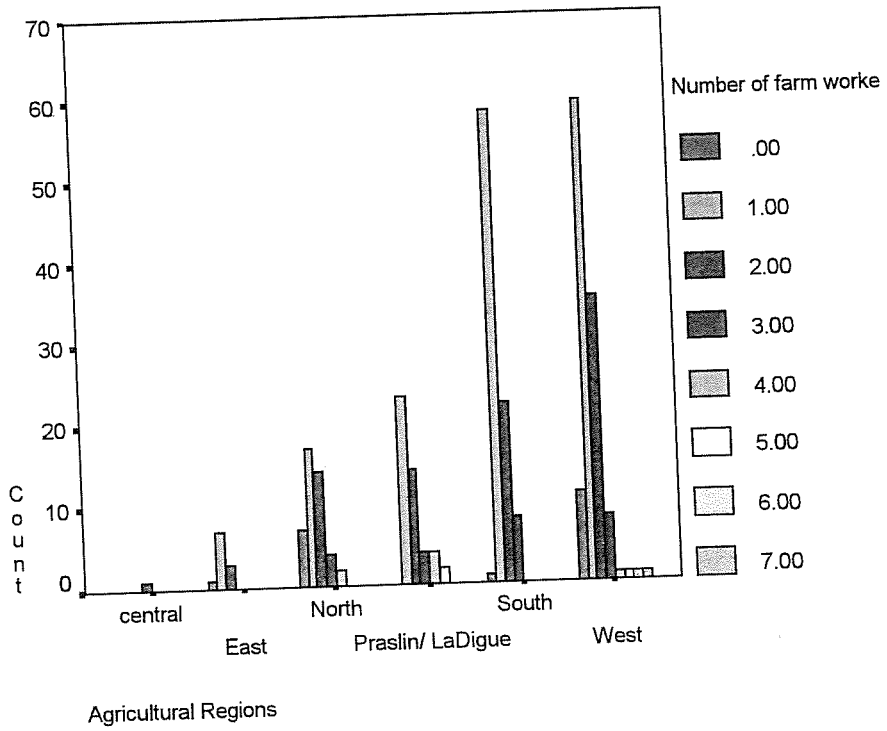


4.8. Labour force

Only 10.7% of farmers employ workers in full-time basis, 17.2% in Casual while 9.1% employ workers in Part-time. 63.1% of farmers do not employ workers.

37% of farmers employ workers than household members.

231 workers were employed in the agricultural sector, out of which 33.7% in full-time basis, 21.6% in part-time and 44.6% casual workers. The distribution of number of workers per farm show that, in all regions, the majority of farmers employ only one worker.

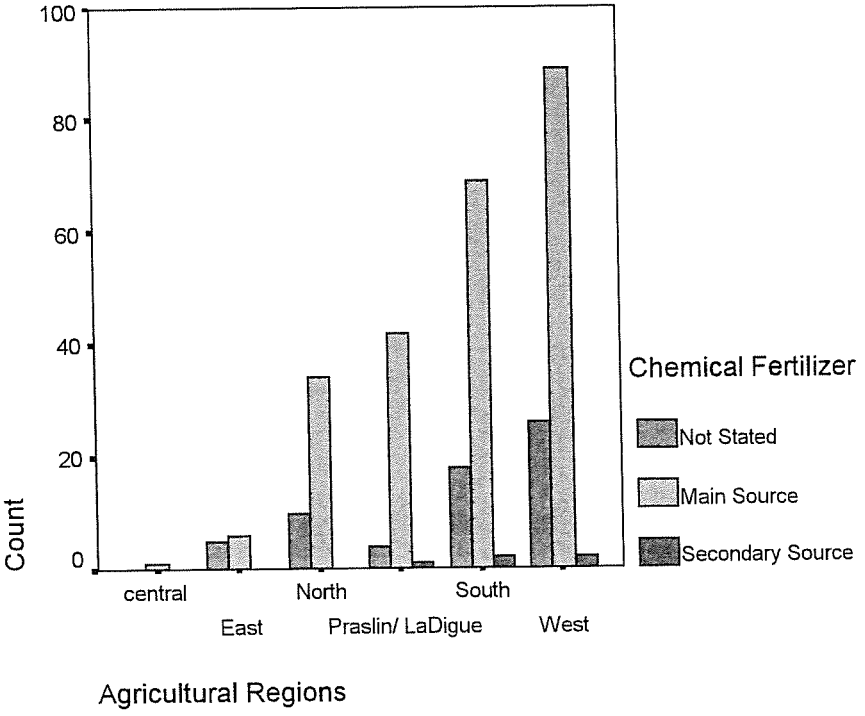


4.9 Type of farming activities.

4.9.1 Crops production activities

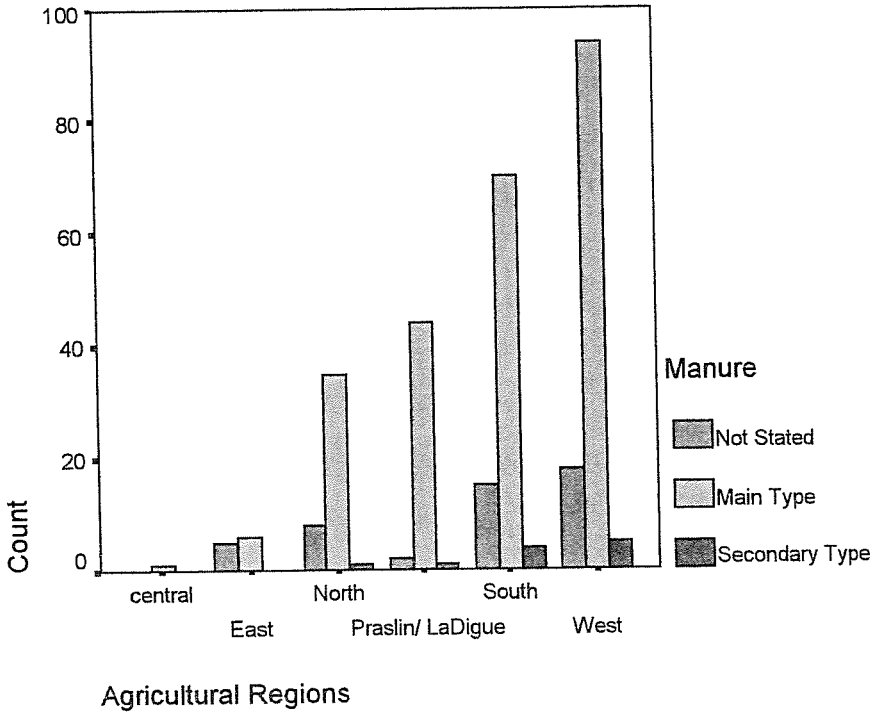
30.4% of farmers are involved in fruits production as main activity, while 26.5% are involved in the production of that crop as secondary activity. Fruits are mainly produced by small-scale farmers (42.5% of farmers producing that crop), and medium scale farmers (35%).

Fruits are mainly produced in the West, the South and in Praslin/La Dique as shown below.



303

Manure is produced and used by 260 farmers (84.1% of them). Within the farmers producing manure, 38% are located in the West, 28.4% located in the South, 17.3% in Praslin/Ladigue, 13.8% in the North and 2.3 in the East. This is summarized in the chart below



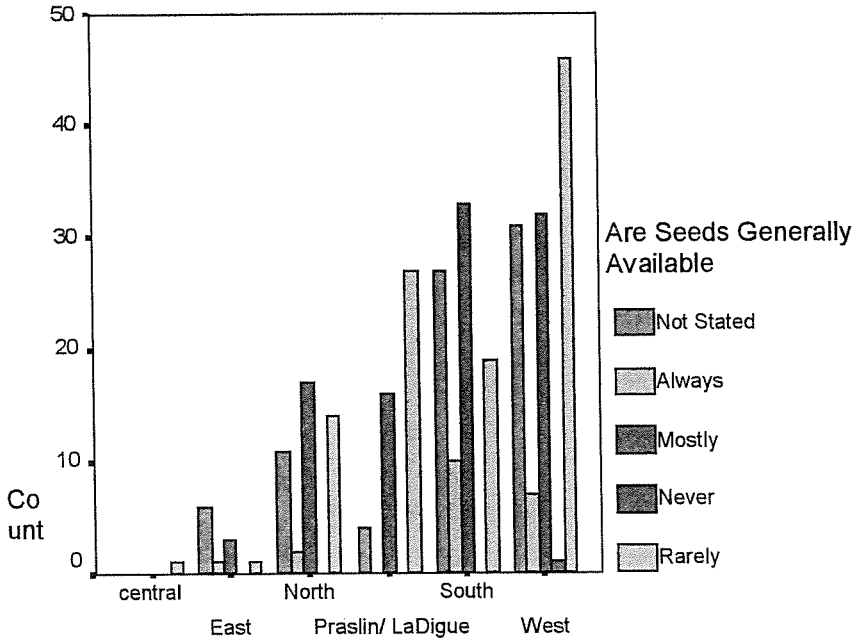
4.12.4.2 Seeds

Only 6.5% of farmers have always access to seeds when needed, while 32.6%, have mostly access to seeds. 35% of farmers have rarely access to seeds when needed. 85% of farmers having always access to seeds when needed are located in the South (50%), and in the North (35%).

The distribution of farmers rarely having access to seeds is as follows:

East: 1%
North: 13%
Praslin/Ladigue: 37.6%
South: 17.6%
West: 42.6%

The following chart shows the status of the availability of seeds when needed per region.

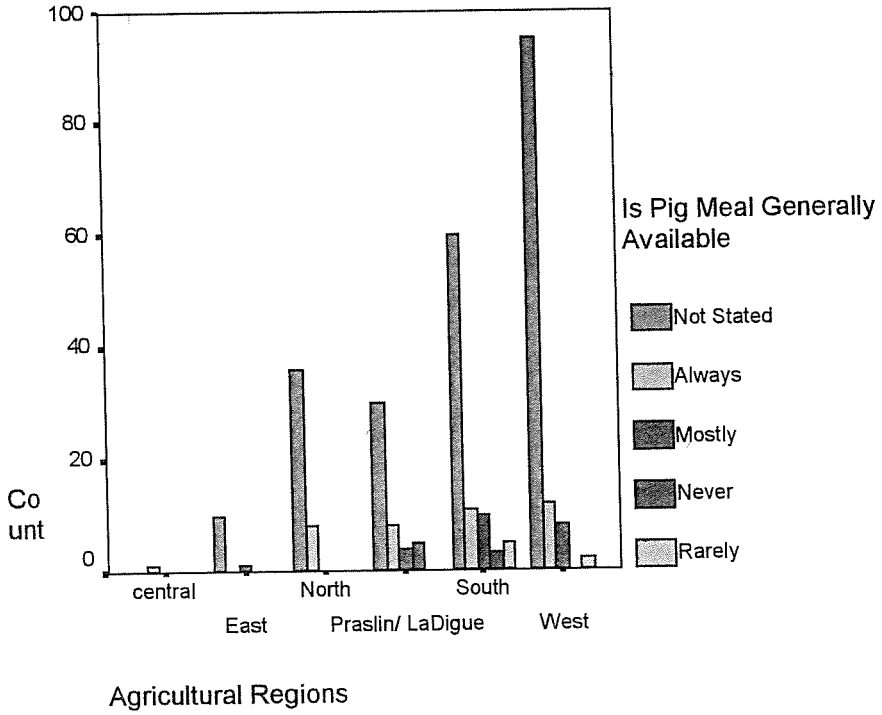


4.12.4.3 Pig meal

38.2% of farmers use manufactured feed for pig. Among the farmers using manufactured feed for pig, 35.6% are located in the West, 28% in the South, 21.2% in Praslin/Ladigue, 11.8% in the North and 2.5% in the East.

23.6% of farmers stated that they always or mostly have access to pig meal while 74.7% of them did not give their opinion.

The chart below shows the status of the access to pig meal per region.

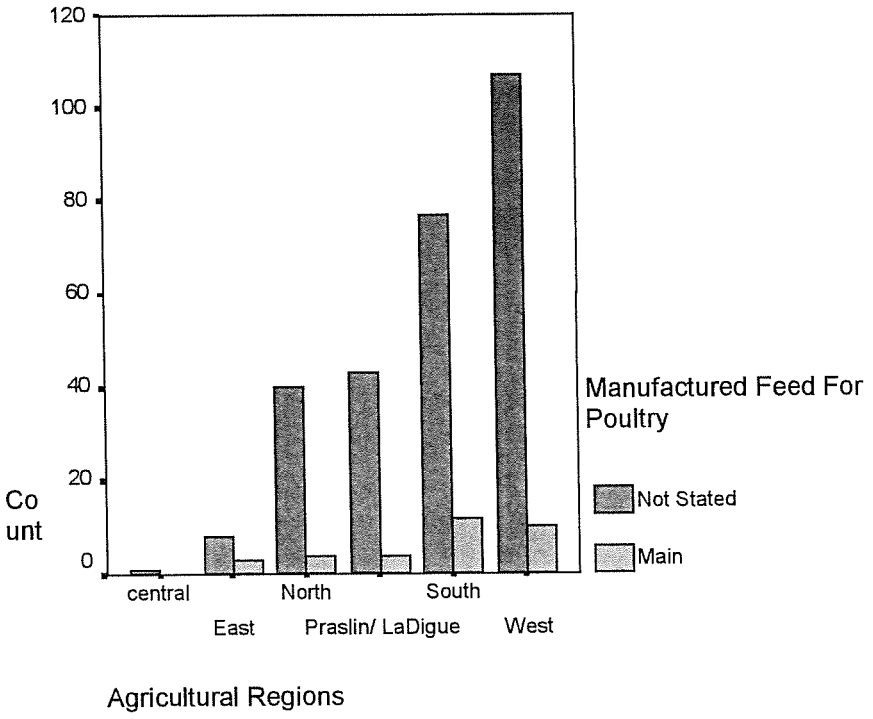


4.12.4.4 Chicken feed

Only 9.7% of farmers are using manufactured feed for poultry. The distribution of farmers using manufactured feed for poultry is as follows:

South: 36.3%
West: 30.3%
Praslin/Ladigue: 12.1%
North: 12.1%
East: 9.1%

The following chart shows the distribution of farmers using manufactured feed for poultry per agricultural region



4.12.4.5 Crop protection

Pesticides are used by 205 farmers (66.55% of them) for crop protection. Within the farmers using pesticides, 35.6% are located in the West, 24.4 in the South, 32.3% in Praslin/Ladigue, 16.6% in the North and 2% in the East. The following chart shows the spatial distribution of farmers using pesticides.

The availability of pesticides to farmers when needed is summarized as follows (in percentage of farmers):

Always: 5.8%
Rarely: 35%
Never: 2.5%
Mostly: 23.9%
Not stated

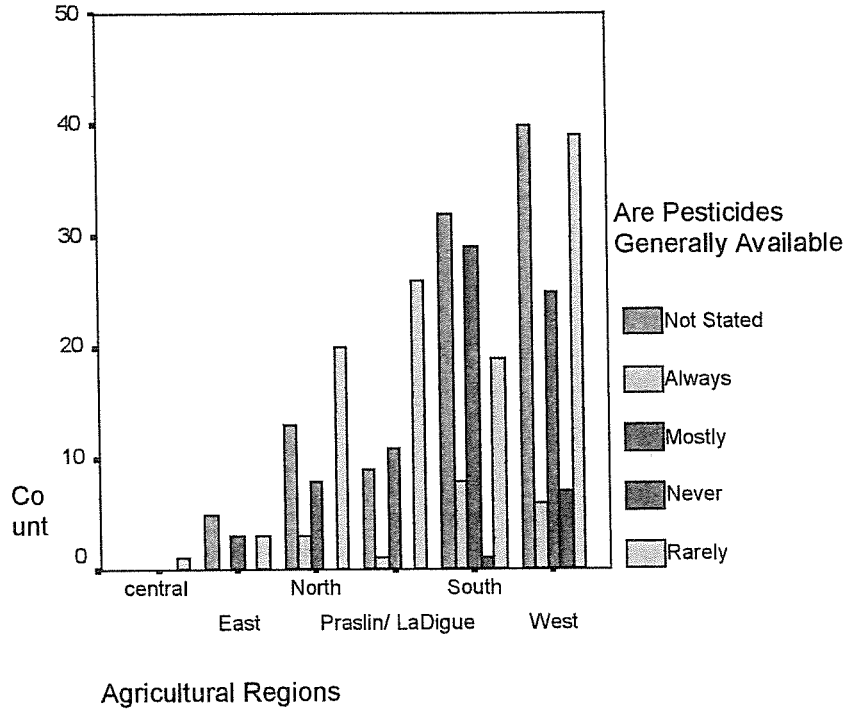
Among farmers rarely accessing to pesticides when needed are located in:

the West: 36%
Praslin/Ladigue: 24%
the North: 18.5%
the South: 17.6%
the East: 1%

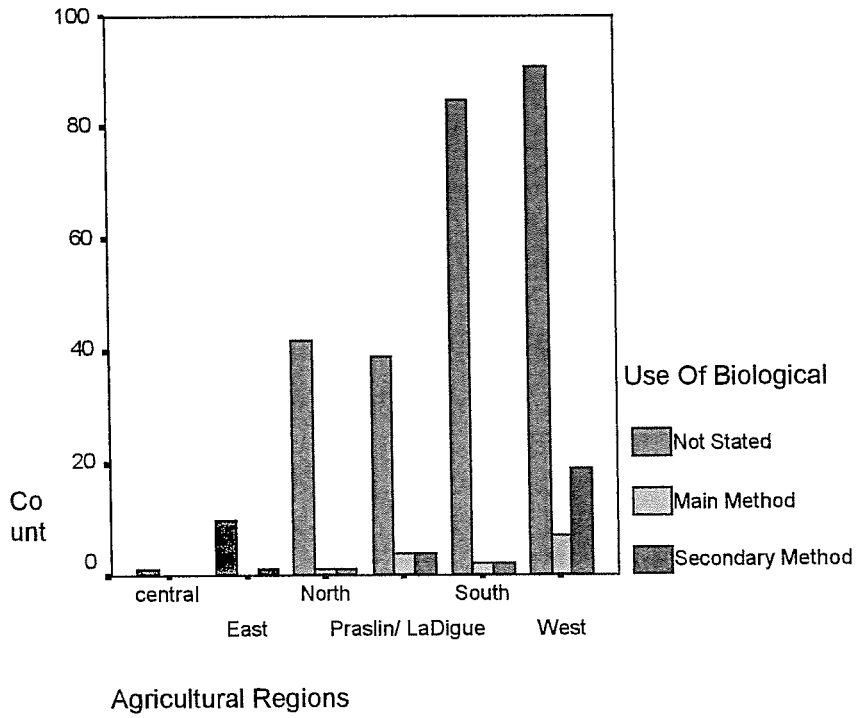
In each region, the distribution of the number of farmers accessing rarely to pesticides when needed is as follows:

Praslin/Ladigue: 60.8%
North: 45.45%
West: 33.3%
East: 27.2%
South: 21.3%

The following chart shows the status of pesticides availability per region.



Only 13.2% of farmers use Biological Control for their crop protection, out of which 8.4% are located in the West region, as shown in the chart below.



🕮 5. Multidimensional analysis.

We will use the Principal Components analysis techniques. The Principal components analysis consists of determining the Eigen values and the Eigen vectors of a Matrix (or a table consisting of p variables and n observations). A principal component or a factor is nothing else than an Eigen value of the matrix, associated to a given Eigen vector. An Eigen vector represents the part of the variance explained by the associated factor.

The computation of various factors enables us to plot the various variables and /or observations in order to facilitate their interpretation.

5.1. Data to be analyzed.

Our analysis will be concentrated to the synoptic table below, with agricultural regions as observations and farmers involved in main activities as variables. The necessary input is the synoptic table below and the outputs are: the correlation matrix of the selected variables, the Eigen values sorted in descending orders, the percentage of variance explained by each factor, the vector's axis of variables and observation points with respect to the various factorial axis, and the scatter graph of variables.

Farmers involved in activity	East	North	Praslin/La Digue	South	West
Farms	11	44	47	90	116
Agric Training	1	4	19	18	25
Dark soil	4	15	2	35	33
Red soil	4	19	5	41	69
Sandy soil	2	2	39	12	13
Agric. Income	8	35	43	65	96
Pesticides	6	34	42	50	73
Manure prod	6	36	45	74	99
Root crops	0	4	2	24	14
Vegetables	4	31	41	60	89
Fruits	5	31	34	44	72
Livestock	8	28	33	46	63
Cattle	2	17	26	21	16
Chickens	3	3	4	15	14
Pigs	4	11	24	34	37
Broilers	1	1	0	3	4
Goats	0	1	0	1	1
Milk	0	2	0	4	1
Layers	2	3	2	10	7
Manure	1	19	31	27	23
Meat	0	0	2	3	2
Pig fattening	4	18	25	39	41
Compost	0	16	5	7	19
Holden male	8	39	39	77	90
Holden female	3	5	6	12	26
Biological control	1	2	8	4	26

5.2. The results

The analysis has been performed using SPSSWIN. The outputs yielded are as follows:

Total Variance Explained

	Initial Eigen values		
Component	**Total**	**% of Variance**	**Cumulative %**
1	16.160	76.954	76.954
2	2.674	12.732	89.687
3	1.355	6.451	96.137
4	.811	3.863	100.000

5.3. Tentative interpretation of results

There are globally twenty-one factors corresponding to the twenty-one Eigen values extracted from the correlation matrix (see the table of total variance explained).

It should be noted that the percentages explained by the three first factors are respectively 76.95%, 12.73% and 6.45%.

Globally, 86.6% of variance is explained by the first and second components. The interpretation could than be limited to the first factorial plan, as shown on the " **COMPONENT PLOT**" with a minimum of information looses.

In a factorial plan, it is known that the more closer are two variables, the more they are correlated, especially when they are far from the origin.

You can note on the graph, the concentration, far from the origin, of the main variables studied around the principal variable which is the total number of farmers involved in a farming activity, namely the number of farmers involved in the breeding of pigs, chickens, livestock or in the use of pesticides, biological control for crop protection, production of root crops etc. On the other hand, sandy soil has no correlation with other variables, while the production of manure is correlated to the number of farmers involved in cattle breeding. It is furthermore surprising that the type of soil (dark and red) have very weak correlation with other variables. Also, training does not seem to have really an importance influence on the other variables

Therefore, in terms of agricultural policy, any action taken in favour of the total number of farmers, will affect all correlated variables.

Please note that, this interpretation is limited, since it is applied to individuals, rather than to quantities variables, due to lack of information.