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**ORIGINAL ARTICLE****Assessment Of The Relationship Between The Typology And Economic Performance Of Farms: A Case Study For A Rural Area Of Province Setif, Algeria****<sup>1</sup>Amar ROUABHI, <sup>1</sup>Miloud HAFSI, <sup>2</sup>Mustapha KEBICHE**<sup>1</sup>*Department of Agronomy, Faculty of SNV, Sétif University, Algeria*<sup>2</sup>*Department of Geography, University of Quebec at Montreal, Canada*

Amar ROUABHI, Miloud HAFSI, Mustapha KEBICHE: Assessment Of The Relationship Between The Typology And Economic Performance Of Farms: A Case Study For A Rural Area Of Province Setif, Algeria

**ABSTRACT**

The survey based on interviews with owners of 188 private farms, it was carried out in six municipalities located in the eastern part of Setif province Algeria: Belaâ, Bir el Arch, El Oueldja, Hammam sokhna, Taya and Tella. Hence 42 variables were obtained from the questionnaires which characterize socio-economic and agricultural condition of the farms. The main aims of the survey were the assessment of the farming practice transformations and building the local typology according to the economic performance of farming system. The used statistical methods were one-way ANOVA, means comparison (LSD test) and Categorical Principal Components Analysis (CATPCA). On the basis of the results, three different types of farms were distinguished and characterized according to their practice transformation (dynamic/conservative) and according to their economic performance.

**Key words:** farm, typology, economic performance, multivariate methods.**Introduction**

Farm typology research has become popular as a way of segmenting farms into groups to assist in developing targeted agricultural policy, public intervention, expert knowledge, decision support systems in regional or local planning knowledge, but some other external non agricultural activities are insufficiently taken into account for understanding the regional diversity level of the farming systems. These approaches are often traditionally directed to the average farmer or to a few farming systems, which may be both far from reality [7,39,19,37,3]. Characterizing spatial variability of farming systems within a target region and their typology is a key step in the implementation of flexible external support (public management, support policy, etc.) and internal activities (farmer's and local authorities' decisions, etc.). More recent work however recognizes that different farming styles will identify different propensities to adopt new farming practices or participate in industry developments [10,41,18,27].

**Materials And Methods***2.1. Methodology and regional context:***Corresponding Author**

In semi arid area, the articulation between the mixed-farming-breeding takes part in the establishment of the agricultural income and the blow to the durability of the farms [36,1]. In the meantime, this durability objective aims at the sustainability of agricultural income but also the ecological resources mobilized to ensure the income growth [40]. In the Algerian Eastern part of Sétif high plains, at the semi-arid climate, highlighted the various climatic, structural, socio-economic constraints of order [1]. These constraints condition the producer's interventions and have a direct incidence on the level of cereal yield [15]. The logical response of the farmers to these constraints results in a series of the practices combined or not in the exploitation aiming at decreasing the risks [1]. The farming system refers to complementary interactions between agricultural land use system corresponding to both agricultural production system and non-agricultural or alternative business within a farm household, and a set of the economic, biophysical, social and technical factors that influence the whole economic activity of the farm household [6,19,34,25,26,42,35,3]. This requires forms of organization and various production logics [9,28]. Hence, the ensuing results can be checked by

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analyzing the economic profit of the farm. It is very powerful to implement all public and private actions in order to promote and stimulate sustainable rural and agriculture development as based mainly on the concepts of multifunctional agriculture [23]. Effective assessment and typology of farming systems can be done by a statistical analysis of a set of variables, quantitative or both quantitative and qualitative (categorical) ones collected as a sample of farms from its population within a region to be studied [20,19,34,25,43,16,13,3,17]. Recorded variables were selectively chosen so they characterize farms regarding all mentioned aspects of farming system.

Characterization and synthetic description of farms variability using a set of mostly quantitative variables and distinguished types of farming systems are usually conducted by principal component analysis (PCA) [6,19,31,34,12,32,16,3,17]. When there are more qualitative variables than quantitative ones, a multiple correspondence analysis (MCA), which is the equivalent for qualitative data of PCA, must be performed instead [17].

Categorical principal components analysis is also known by the acronym CATPCA and can be thought of as a method of dimension reduction. A set of variables is analyzed to reveal major dimensions of variation. The original data set can then be replaced by a new, smaller data set with minimal loss of information. The method reveals relationships among variables, among cases, and among variables and cases. The criterion CATPCA for quantifying the observed data is that the object scores (component scores) should have large correlations with each of the quantified variables. A solution is good to the extent that this criterion is satisfied [29].

This study is focused on the relationship between the typology and the economic performance of the farms according to a regional level in a rural area of eastern part of Sétif province, where farming has kept typical rural landscape including traditional architecture (cereals-ovine breeding), which had not been changed substantially by multi-year processes of modernization in the rural agricultural activities. In spite of extensive agricultural system used in the assessed area, new agricultural practices seemed to take place which are based mainly on investment with high-input or integrated agricultural system including mostly dairy production and aviculture systems. Although, in the studied area private legal status characterizes about 95% of farms, which are confronted to hard natural conditions such as climate constraints, desertification and water salinity

according to the ministry of agriculture and rural development [22], it would be a good example to determine and to know the typology as well as the future of farms in such condition.

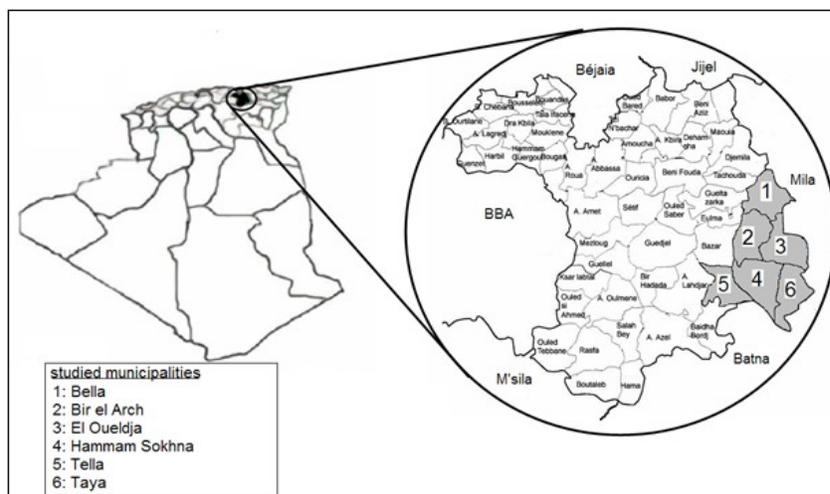
Unfortunately, up till now no formal studies of farming systems variability and their typology at the farm level within family farms in Sétif province and around Algeria have been conducted. So, we would like to undertake this task in this paper assuming it as a case study in this region, which is also more representative to other similar rural areas in the country. The aim of the study is

- To establish farm's typologies according to economic performance on the basis of a survey including interviews with owners of 188 private farms.
- Using farm typology as a tool by support decision makers, experts, local planners, rural organization and farmers for identifying opportunities and constraints to improve each farming system type, evaluating government grant programs such as (National Plan of Agriculture Development) (PNDA), determining efficient technical and economic pathways, strategies and ways of these improvements in both agricultural production systems and non-agricultural on-farm accordingly to present challenges of Common Agricultural Policy based on durability paradigm.

#### 2.1.1. Study sample:

The study was carried out in six municipalities of eastern part of Sétif province, namely, Belaâ, Bir el Arch, El Ouedja, Hammam sokhna, Taya and Tella (Fig. 1). The province is located in north-eastern Algeria (36°11 N, 5°25 E), covering 6.550 Km<sup>2</sup>, it is bordered by six provinces to the east by Mila, to the west by Bordj-Bou Arreridj, to the north by Bejaia and Jijel Mountains and to the south by Batna and M'sila. Sétif high plains were characterized by three climatic stages: the superior semi-arid, which at an average scale receives some 400 to 500 mm of rain per annum; the middle semi-arid, (300 to 400 mm/year); and the inferior semi-arid, (200 to 300 mm/year) [1].

A survey based on interviews with owners of 188 private farms. The studied area is assumed to be representative and rather be considered a homogenous eastern part of the province belonging to an area having relatively most advanced and intensive agriculture especially aviculture, cattle farming and irrigated crops.



**Fig. 1:** Location of the study area within Algeria and Sétif province: assessed municipalities marked by grey color are representative to the eastern part of the province....

### 2.1.2. Data collection and analysis:

A structured face to face questionnaire was developed with the heads of the private farms, carried out between July and October 2010. The questionnaire included questions regarding many current characteristics of farming system describing facts and farmers' scores of reality in this year and within the last 10 years. The 42 variables obtained from the questionnaires included 22 quantitative and 20 categorical, where (8 nominal, 5 binary and 7 (ordinal)), the ordinal variables were scored from (1 to 5) as [1 (slight), 2 (low), 3 (moderate), 4 (high), 5 (very high)] variables, in accordance with the methodology used by Madry *et al.*, (2010). These variables related to:

- Socio-economic conditions including several information according to the past and to the

evolution of farms and basically to the agricultural dynamic practices, where every farmer assessed the change processes of modernization in the rural agricultural activities from a binary and nominal series of variables (Table 1)

- Structure of agricultural production and farm performances where at the time of the questionnaire every farmer should evaluate his own farm from a scaled score from 1 to 5.

A representative sample was drawn using stratified sampling based on randomly chosen villages as strata [42,38], this ensured a sufficient number of observations for each stratum group. Therefore 188 farms were selected from the six municipalities (about 5% of the total number of farms in the study area).

**Table 1:** Definition of the overall variables gathered in developing a typology of 188 farms related to farming systems in eastern part of Sétif province, Algeria.

Category	Variables	acronym	Units
Socio-economic conditions	Municipality [nominal]	<i>Mun</i>	
	Age of farmer [scale: 1 (age<30 years) , 2 (30<age<50 years), 3 (age>50 years)]	<i>age</i>	
	Education of the farmer [scale: from 1 (no instruction) to 5 (higher)]	<i>educ</i>	
	Material self efficiency [order scale: 1 to 5]	<i>Mat_self_eff</i>	
	Economic performance [order scale: 1 to 5]	<i>Eco_perf</i>	
farmer's agricultural practices	Farmer accumulated agricultural experience	<i>Far_exp</i>	Years
	Oldest practiced agricultural activities[nominal]	<i>Old_prac</i>	
	first dominant agricultural activity [nominal]	<i>Dom_act_1</i>	
	second dominant agricultural activity [nominal]	<i>Dom_act_2</i>	
	First new introduced agricultural activity [nominal]	<i>Intr_act_1</i>	
farmer's attitude and motivations	second new introduced agricultural activity [nominal]	<i>Intr_act_2</i>	
	Reasons for introducing new agricultural activities[nominal]	<i>Reason_intr_act</i>	
	innovation invests in the farm during last 5 years [binary]	<i>Innov_invest</i>	
	Government subvention program membership [binary]	<i>Gov_prog</i>	
	Practice other non agricultural activities [binary]	<i>Pract_non_agr</i>	
	Intention to leave agricultural activity [binary]	<i>Int_leav_agr</i>	
	Reasons for leaving agricultural activities [nominal]	<i>Reason_leav_agr</i>	
farmer's attitude and motivations	Period of practicing newest introduced activities [order scale: 1 (recent=within last 5 years), 2 (medium=before 5 years old), 3 (oldest= before 10 years old).]	<i>Period_intr_act</i>	
	Family division farm within last 10 years [binary]	<i>Fam_div</i>	

Structure of agri-cultural production	Arable area farm (AA)	AA	ha
	Utilized agricultural area (UAA)	UAA	ha
	Field crops in AA (cereals plus fodder)	Field_crop	ha
	Share of field crops in AA	Field_crop_percent	%
	Plantation in AA	Plant	ha
	Share of plantation in AA	Plant_percent	%
	gardening crops in AA	Gard	ha
	Share gardening crops in AA	Gard_percent	%
Cattle breeding and poultry farming	Number of cows	Cows	unit
	Number of sheep	Sheep	unit
	Poultry egg (number of chick)	Poult_egg	unit
	Poultry meat (number of chick)	Poult_meat	unit
Farm water resources capabilities	Water resources capability order scale: [order scale: 1 to 5]	Wat_ress_cap	
	Number of water drills by farm	Water_drill	unit
	Number of wells by farm	Well	unit
	Drill pumping depth	Drill_pum_depth	Meter
	well pumping depth	Well_pum_depth	Meter
	Irrigated area in AA	Irrig	ha
	Share of irrigated area in AA	Irrig_percent	%
	Non irrigated area in UAA	Non_irrig	ha
	Drilled depth by hectare of UAA	Drilled_depth_ha_UAA	Meter
	Drilled depth by hectare of irrigated area	Drilled_depth_ha_irrig	Meter
	Rate of ground water level fall within last 10 years [order scale: 1 to 5]	Grd_wat_lev_fall	

### 2.1.3. Study approach:

In most rural areas, the family exploitation form is already dominant. It is for this reason that in the chosen theoretical approach, the family production unit is taken as a reference unit [5]. In recent years, the study area has been subject to significant variability according to the change of agricultural practices given the changing socio-economic system on one hand, and on the effects of desertification and water scarcity on the other. The work attempts to analyze and compare the economic performance of farms, analyze how they are coping with and understanding their logical evolution in time.

The analysis of the diversity of operations leads to the construction of typical typologies on a better economic performance to ensure the viability of operations, to adapt the proposals relating to technical and State aid programs such as (*Plan National de développement agricole* (PNDA), without neglecting the environmental aspect and sustainability.

## Results And Discussion

All data are subjected to several statistical analyses in order to bring out the typical farm characterization with high economic performance according to the assessed municipalities as a geographical approach.

Firstly, economic performance (*eco\_perf*) as a dependent variable was subjected to Leven test in order to check its variability within the studied sample, then a one-way ANOVA Analysis was carried out, to verify it's discrimination towards to the municipalities, in other words to demonstrate if municipalities are significantly different according to (*eco\_perf*) variable, The significance level was set at 0.05.

Secondly, a compare means analysis is performed to classify municipalities to significantly different groups using Least Significant Difference test (LSD). Once the significantly different clusters are fixed according to (*eco\_perf*) variable, CAPTCA analysis was performed to check the data obtained in the (LSD) test in order to characterize the clusters having a highest economic performance. CATPCA is a type of factor analysis adapted for use in social and behavioral science research due to the often nonnumeric nature of survey responses [30]. It is appropriate for data reduction when variables are categorical and the researcher is concerned with identifying the underlying components of a set of while maximizing the amount of variance accounted for in those variables (by the principal components). The primary benefit of using CATPCA rather than traditional PCA is the lack of assumptions associated with CATPCA. Which does not assume linear relationships among numeric data nor does it require assuming multivariate normal data. Furthermore, optimal scaling is used in statistical software as SPSS, so CATPCA is a non-trivial function of SPSS which commences analysis via optimal quantification, a process whereby categories of the categorical variables are appointed continuous numeric values [21,30]. This process is important since numeric values are essential for variance and Pearson correlation calculations [21]. In CATPCA analysis, scaling all variables at the numeric level corresponds to standard PCA. Alternate plotting features are available by using the transformed variables in a standard linear PCA. If all variables have multiple nominal scaling levels, CATPCA is identical to multiple correspondence analysis (MCA). In this paper all statistical analyses were performed by SPSS v18.

### 3.1. Univariate evaluation of the farms:

Measures of central tendency and variability for all variables show different variability among studied categories.

#### *Social-economic conditions:*

farms conditions demonstrate particular social-economic status with highest experienced agriculture about 28 years per farmer. As a result, the majority of farmers have a mean age exceeding 50 years farmers and their basic education and training in farming demonstrate accumulation of entrepreneurial human capital in this area. Farmers' opinion about their self material efficiency and agricultural production profitability scales in 2010 was moderate to average being also moderately ranged in the set of farms (Table 2).

#### *Farmers' motivations and attitude:*

was mostly fitting with respect to attachment agricultural activity. About 62% of farms are practicing only in agricultural sector and 82% of farmers have not any intention to leave their activity; this attitude was extremely variable among the farmers. Proportion of innovation investments in the farm made over last 5 years approached to 64%. However, farmer's motivation towards government aid programs was substantially weak, yet 75% of farmers do not participate in these programs.

#### *The structure of agricultural production:*

the share of plantation crops of the total arable area (AA), plantation area and field crop area were extremely variable. The average farm size in the sample was 28 ha, while the mean for Sétif province is currently only about 09 ha for private farms. This

conclusion resulted from mean share of field crops (cereals and fodder) in total AA corresponding to about 68%, while the share of gardening crops of the total AA was about 15%, so only two crop groups were grown (cereals, potato) in the studied region, while crop diversity in other parts of the country is currently much richer [4]. The share of irrigated area of AA was about 5 ha less than the respective part within Sétif province by 4 ha.

#### *Cattle-breeding and poultry farming:*

The sampled farms were relatively characterized by relatively large cattle breeding density, so bovine and ovine breeding density means corresponded to 0.86 and 2.00 head/ha of Utilized agricultural area (UAA) respectively while the means for the Sétif province are respectively about only 0.31 and 1.31 head/ha of UAA. Poultry density in the studied area was very large in comparison to the average of province, the means of poultry egg and poultry meat were respectively about 4095 and 2925 chicks by farm, while the respective means of the province were 341chicks by farm for poultry egg and 152 chicks by farm for the poultry meat, but showing high variability among farms.

#### *Farm water resources capabilities:*

the majority of farms were supplied with one well or one water drill at least, however the mean pumping level was very high with about 126 and 29 meter in depth for water drills and wells respectively. As a result, farm water capability was relatively low and the drilling rate was extremely high with 360 meters in some areas. Furthermore, ground water level was moderately falling within last 10 years; this demonstrates the big tension on water resources in this area.

**Table 2:** Descriptive statistics for the observed variables used to develop a typology of the 188 farms

variable	Mean	Min	Max	SD	CV %
<b>Socio-economic conditions</b>					
<i>age</i>	2.57	1	3	0.49	19,07%
<i>educ</i>	1.82	1	5	1.23	67,58%
<i>Mat_self_eff</i>	2.59	1	5	1.30	50,19%
<i>Eco_perf</i>	2.86	1	5	0.85	29,72%
<i>Far_exp</i>	28.14	2	61	11.25	39,98%
<b>farmer's attitude and motivations</b>					
<i>Innov_invest</i>	0.64	0	1	0.48	75,00%
<i>Gov_prog</i>	0.25	0	1	0.43	172,00%
<i>Pract_non_agr</i>	0.38	0	1	0.48	126,32%
<i>Int_leav_agr</i>	0.12	0	1	0.32	266,67%
<i>Period_intr_act</i>	1.5	1	3	0.67	44,67%
<i>Fam_div</i>	0.44	0	1	0.49	111,36%
<b>Structure of agri-cultural production</b>					
<i>AA</i>	28.01	0	450	53.04	189,36%
<i>UAA</i>	23.59	0	390	45.39	192,41%
<i>Field_crop</i>	20.91	0	390	45.09	215,64%
<i>Field_crop_percent</i>	67.78	0	100	27.03	39,88%
<i>Plant</i>	0.24	0	4	0.72	300,00%
<i>Plant_percent</i>	2.11	0	60	8.05	381,52%
<i>Gard</i>	2.64	0	30	4.21	159,47%

<i>Gard_percent</i>	14.65	0	100	20.54	140,20%
Cattle breeding and poultry farming					
<i>Cows</i>	20.46	0	300	39.61	193,60%
<i>Sheep</i>	47.22	0	500	63.82	135,15%
<i>Poult_egg</i>	4094.68	0	120000	12198.47	297,91%
<i>Poult_meat</i>	2925.80	0	40000	5521.32	188,71%
Farm water ressources capabilities					
<i>Wat_ress_cap</i>	1.35	1	4	0.66	48,89%
<i>Water_drill</i>	0.65	0	2	0.66	101,54%
<i>Well</i>	0.57	0	2	0.60	105,26%
<i>Drill_pum_depth</i>	67.7	0	360	74.74	110,40%
<i>Well_pum_depth</i>	15.26	0	90	18.35	120,25%
<i>Irrig</i>	4.69	0	70	7.46	159,06%
<i>Irrig_percent</i>	27.40	0	100	28.86	105,33%
<i>Non_irrig</i>	18.90	0	390	44.81	237,09%
<i>Drilled_depth_ha_UAA</i>	10.35	0	200	17.84	172,37%
<i>Drilled_depth_ha_irrig</i>	27.57	0	200	29.69	107,69%
<i>Grd_wat_lev_fall</i>	3.18	1	5	1.26	39,62%

3.2. Typology and multivariate analysis:

Analysis of variance showed that all municipalities are significantly different at 1% level for the (*eco\_perf*) variable, and the multiple comparisons means (LSD) shows a formation of two groups of municipalities significantly different. The first group with high economic performance (a) formed by Hammam Sokhna, Taya and Bir el Arch

municipalities, the second group with low economic performance (b) formed by El Oueldja and Belâa municipalities, the third group with medium economic performance (ab) formed by Tella municipality (Table 3). We have to see if this trend is not influenced by a territorial structure or by other criteria of economic basic infrastructure such as markets, consuming masses of people, roads, or other effects of business tissue functions.

Table 3: Different economic performance groups resulting from LSD test.

Municipality	Economic performance
Hammam Sokhna	3.10 <sup>a</sup> ± 0.12
Bir el Arch	3.05 <sup>a</sup> ± 0.11
Taya	3.03 <sup>a</sup> ± 0.18
Tella	2.76 <sup>ab</sup> ± 0.15
El Oueldja	2.50 <sup>b</sup> ± 0.15
Belaâ	2.48 <sup>b</sup> ± 0.16

Note that a several iterative CATPCA analysis has been conducted, where a number of variables (12 variables) were dropped from analysis because of their very small mean coordinate and their weak variance accounted for. These variables may not be suitably contributing to the principal components.

The Model Summary displays the internal consistency coefficient (Cronbach's Alpha) for each dimension (Table 3). However, using the eigenvalues, we can calculate the percentage of variance accounted for. The first dimension accounts for 36.50 % of the variance in the optimally scaled matrix of 19 items. The second one accounts for

32.27%, so the combination of both dimension account for 68.77%.

The proportion of total variance, in individual and accumulated percentages, explained by each dimension (Table 4); Where the analysis has generated 2 dimensions that explain 68.77% of the total variance; Figure 4 shows the matrix of factor loadings, i.e. the correlations between each variable and the factor. Factor loadings of more than 0.5 are considered to be significant [14]. The factors generated can therefore be described and interpreted in the following way:

Dimension 1:

Table 4: The principal dimensions and Variance accounted for.

Dimension	Cronbach's Alpha	Variance Accounted For		Explains 36.50 % of the total variance and is characterized by five variables: <i>AA, UAA, Non_irrig, Field_egg</i> and <i>sheep</i> (Fig. 2). This dimension explains 70% of the variability type of large-scale practicing rain fed crops in other words it is a traditional type of farming. These production systems result in a series of logics and compontments which lie generally within a cope dominated by extensive cereals cultivation integrated into the ovine breeding [8].
		Multiple Nominal Variables	Non Multiple Variables	
1	0.903	0.137	0.235	Total (Eigenvalue) = 12.35
2	0.883	0.336	0.235	
Total	0.973 <sup>a</sup>	0.236 <sup>b</sup>	0.235 <sup>c</sup>	

<sup>a</sup>. Total Cronbach's Alpha is based on the total Eigenvalue.

<sup>b</sup>. Mean over dimensions.

<sup>c</sup>. Because there are Multiple Nominal variables, total Eigenvalue is not the sum over dimensions.

Dimension 2:

explains 32.27% of the variance and is characterized by 9 variables: *Irrig\_percent*,

*Gard\_percent*, *Cows*, *Gard*, *Irrig*, *Drill\_pump\_depth*, *Drilled depth \_ha\_UAA*, *Wat\_ress\_cap* and *Water\_drill*, this axis represents the variability of small-scale dynamics that has many practices and investment to ensure their viability

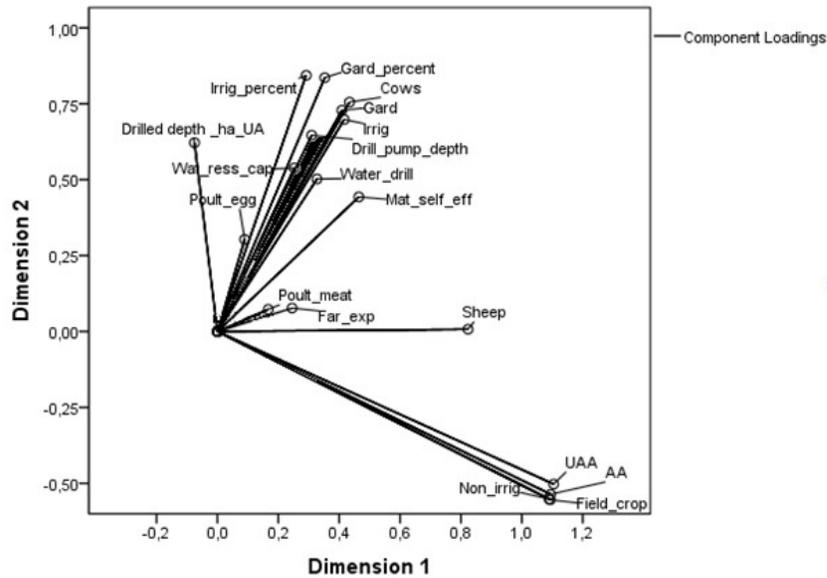


Fig. 2: The effective variables utilized in the typology construction.

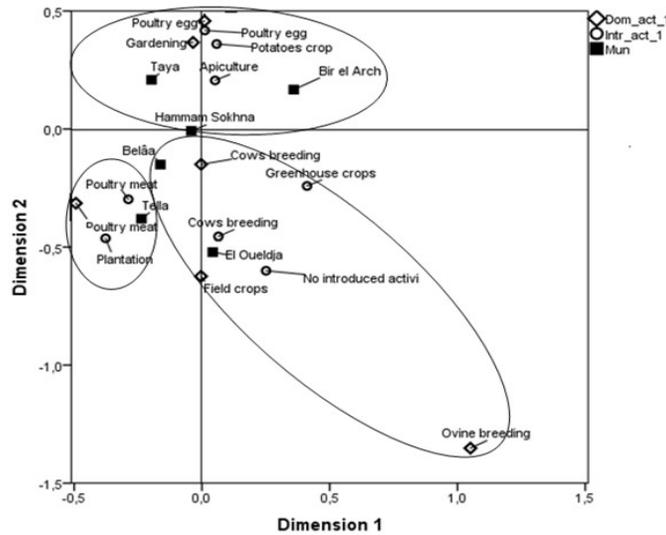
In order to study practices transformation of farms over the space and time, a set of variables (*Eco\_perf*), (*Mun*), (*Dom\_act1*) and (*Intr\_act1*) were treated as multiple nominal variables under CATPCA analysis in order to see the dynamics of practice and its effect on farms economic performance. For a given region, old agricultural practices which are still dominant (*Dom\_act1*), are strongly adopted by farmers, however, recently introduced agricultural practices (*Intr\_act1*), explain the attempt of farmers to improve their economic performance by introducing new practices on the one hand, and renounce the old practices that do not comply the economic requirements rather the other. As a result, we can target and bring out the most adapted practice for every region accordingly to high economic performance, at the same time, show up the characteristics of the groups with weak economic performance.

Three groups of these illustrative variables, referring to different income groups trained in the LSD test; hence, we can define groups and see the respective characteristics of each one (Fig. 3).

The first group with a high economic performance includes three municipalities Hammam Sokhna, Taya and Bir el arch. This group is

characterized by several speculations namely poultry egg, gardening and apiculture. Farmers of Taya municipality practice about 60% poultry egg as a dominant practice and the same proportion of farmers have recently introduced this new practice, having said that this practice has attracted a large number of farmers over the last ten years for socioeconomic reasons, that would be an indicative of correlated cooperative phenomena between groups of interacting agents at the microscopic level [33]. Before that, the majority of farmers practiced traditional crops such as field crops and ovine breeding.

Hence, there is no doubt that this affinity for this new practice would have an impact on farm income and the region tends to specialize in poultry egg production seen its profitability, and its place among other ancient practices. However, Taya municipality has a rate of 26% of bovine breeding, which describes this municipality as a typical region of animal production vocation. Hammam Sokhna municipality was characterized by cow breeding and poultry meat about 35% and 23% respectively as dominant practices. However, 35% of farmers in this municipality opted for the introduction of the potatoes crops.



**Fig. 3:** The economic performance typology in response to changing agricultural practices.

While Bir el Arch municipality is characterized by the dominance of cow breeding by 39%. However, 29% of farmers have introduced the potatoes crops as a new practice, and some farms have opted for other crops such as apiculture and greenhouse crops. From this result, one could say that this municipality has diversity and an important skill to changes towards agricultural practices. Thus, the orientation of the state agricultural aid policies should now take into account the specific areas and their ability to change.

The second group with moderate economic performance represented by Tella municipality, characterized by the dominance and the introduction of poultry meat as a newest activity, but this, had no positive economic spin-offs as in the case of other municipalities as Taya municipality. This could be designed by a lack of mastery of the new introduced practice as poultry meat, or to market fluctuations, often the market poultry meat has always been unstable throughout the country [11]. The state intervention in this region, where the instability of supply and demand is the major problem, can be solved by the installation of local markets or increasing storage capacity and promotion of local poultry production by the installation of refrigeration system (cold rooms). This group is also characterized by the introduction of planting fruit trees, this new activity comes only after several years in production and its gain is not immediate.

The third group with low economic performance represented by the municipalities of Belâa and El Ouedja, are characterized by cows breeding and greenhouse crops and traditional practices such as field crops and ovine breeding, it can be treated as a conservative farming regime, as most farmers have remained attached to the ancient cultures and did not introduce new practices, the alternative of the state

towards this region is to promote other economic activities other than agriculture such as crafts and services. Belâa municipality included in this group, but its position is unmarked towards others municipalities, this is due to practices that are varied, about 48% of cows breeding and 29% of gardening, but it had no positive effect on economic performance as was the case for other municipalities, it is said that this municipality does not hold true agricultural potential and where agricultural use is strongly contested.

*Conclusion:*

Agriculture in semi-arid conditions is subjected to chronic instability due to natural hazards, so that development in these areas becomes a problematic task, the reorientation of development policies must take into account the temporal variability of farmer's trends and threats that arise and compromise the production activities. The economic analysis of the study area shows a distinction between whole municipalities, of course this is probably due to local conditions and farmers motivation to adapt with chronic instability of the production conditions, the result pointed to three different groups of economic performance (high, medium and low); the first group (Hammam Sokhna, Bir el Arch and Taya) is characterized by dynamic changes in agricultural practices, more farmers were able to find the right combination by introducing the most appropriate practices for the region and therefore have an economic gain.

The second group represented by Belâa municipality with moderate economic performance, shows that average less dynamic compared to the previous group. And finally, the group with low economic performance represented by Tella and El

ouledja municipalities is characterized by traditional practices and is more conservative and did not introduce other new activities. So we can conclude from this study that the economic performance of a given farm is closely related to its dynamics to introduce new activities on the condition that it is adequate in relation to local economic environment, the role of the state is the promotion of these areas by establishing specific aid programs to each region by account pros and cons of each area, this should be a comprehensive approach that covers a wider geographical area as a region or an entire country.

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