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Research on the diversity of vegetable production in Arad County

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Abstract
Our study focuses on the fruit and vegetable farmers in Arad County aiming to offer a clearer image on vegetable and fruit production. This paper is part of a larger study and only wishes to address aspects related to the fruit and vegetable farmer's property forms and product diversity.
Keywords: agromarketing, agrobusiness, vegetable production, fruit product diversity

Introduction

Vegetable production was an important part of Arad County's exports before '89, and we would only mention the greenhouses that practically no longer exist today. Also there were a large number of small scale fruit and vegetable farmers grouped in production areas that provided for the county's markets. Today, fruit and vegetable production is fragmented and grouped around diverse vegetable categories due to the soil's quality being determined for quality as well as vegetable type.

Thus Arad has areas acknowledged as specialized vegetable crop sites such as: Curtici for tomatoes, Semlac for yellow and red watermelon, Podgoria for grapes, Socodor for cabbage, Turnu for greens and Seleus which is acknowledged as the largest greenhouse and sun foil vegetable production site.

Due to the fact that after 89 C.A.P's ceased to exist and people got back their lands, production areas registered a significant decrease

in size. Additionally mass production was negatively affected and could not provide large quantities of fruits and vegetables any longer. A second factor that played part in the decrease of vegetable/fruit production in Arad County was the heavy emigration of German ethnics which constituted the core of vegetable farmers.

Qualitative and quantitative evidence shows that fruit and vegetable production is weak, almost nonexistent, and the lack of a dedicated data centralizing system can not provide relevant information to show whether an association of small farmers could produce enough as to make their entry on a market dominated by multinational companies.

The objectives of the study were multiple; however this paper will only focus on those objectives that concern product diversity and the farmers' technological equipment level. Thus we present the following objectives:

- Knowledge on Arad's fruit/vegetable farmer's forms of property was considered in this study as a primary development motor. We have also emitted a hypothesis according to which the most usual form of property, covering more than 50% of vegetable/fruit farmers, is the Agricultural farmer certificate;
- The share of fruit/vegetable production out of the total agricultural activity was determined as an object in order to highlight the number of those involved exclusively in the fruit/vegetable production;
- The size of the fields designated for fruit/vegetable cultures was also considered as an objective for creating a clearer image about the size of said fields, knowing the fact that greenhouse crops necessitate significantly smaller areas compared to the regular agricultural approach;
- The diversity of vegetable and fruit production was another objective thru which we tried to identify an answer for the problem of production diversity fluctuations related to prices registered for the previous year. We have hypothesized that over 50% of farmers modify their crop in relation to prices registered for the previous years;

Materials and Methods

In order to select a representative sample group we have used a mix of methods: *the areolar method* (Pop, 2004) through which we selected areas recognized as important in fruit/vegetable production and *the stratified random survey method* (Pop, 2004) applied to select the top 30% farmers as designated by the local town halls' records and by the size of the land owned in relation to the production type applied (greenhouse, foil, agricultural terrain).

The study was made on the basis of a questionnaire, administrated through three field agents during a three month period (July-September 2011) having a number of 201 respondents. Data was processed with the aid of a statistical program.

Literature review

According to the preliminary data from the 2010 General Agricultural Census there are 3.856 agricultural holdings, 99.20% of which lack legal personality (individual agricultural enterprises, authorized individuals) and 0.80% which have legal personality (agricultural societies, research facilities, town/city councils and other public institutions).

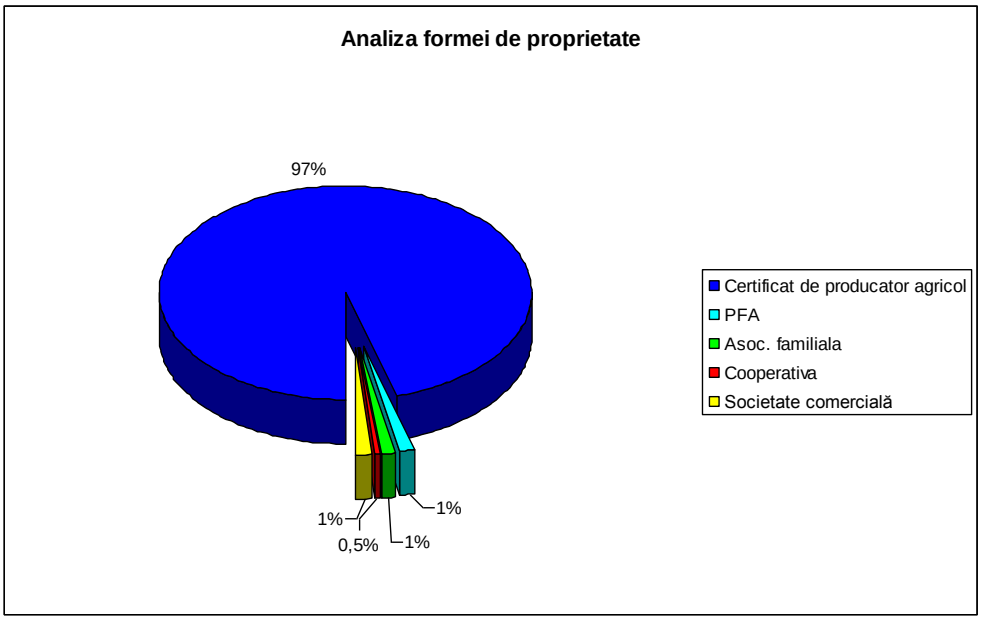
After 1990 (Zahiu, 2010), the share of vegetable production areas registered a permanent fluctuation, first of all because of the way production is managed, secondly because of the numerous work force required and thirdly because the high costs associated with pest control. From 2001 onwards imported vegetables have found a way to our domestic market because of their lower price point even though they are of lower quality.

Even though Romania posses an important fruit growing area, low efficiency and reduced group cohesion in fruit production determines the lack of a competent offer on the market.

The Romanian fruit/vegetable sector does not satisfy the market's rhythmic sale needs fact which combined with the lack of specialized storage areas practically dismisses the vast majority of producers. Organizing producers in professional groups may create an important competitor for imported fruits and vegetables and may help promote a durable development of the rural sector.

Results and Discussion

Questionnaire respondent distribution for recognized vegetable producing areas: 28% are from Felnac, folowed by 26% from Seleus, 24% Siria (Galsa and Iermata being included), Curtici 22% (Macea being included) and finally Lipova with 0.5% of respondents.



Graphic no.1. - Analysis of the ownership forms

Graphic 1 shows that the most occurring ownership form (97%) for vegetable/fruit producers in Arad is the Agricultural farmer certificate, the remaining forms having less than 1%.

The number of people involved in agricultural activities, represented in percentages, is as follows: two (42%), one (21%) three (18%) and respectively four (16%).

Applying the *hi square* test, the void hypothesis according to which there is no connection between ownership form and the number of people involved is rejected, validating an interdependence hypothesis between the two before mentioned categories. The Spearman correlation coefficient has a value of 0.159 corresponding to a 0.024 significance threshold (hence less than 0.005) which leads to the conclusion that there is a weak but direct and positive link between the two; the more

complex the ownership form (agricultural farmer certificate, cooperative, company) the larger the number of people involved. It must be specified that in the time frame the study was conducted, changes in the Romanian labor code imposed the introduction of employment records for day laborers, which in turn created confusion amongst the vegetable/fruit producers, fact that can be a perturbing factor in validating these data.

A statistical analysis of activity data shows that 22% of the respondents are also active in zootechnics; amongst these, 70% declared that the share of zootechnics related activities sum up to 10%-30%. 30.5% declared that they also cultivate grains, 67.3% of these appreciate grain related activities to vary between 10% and 50%.

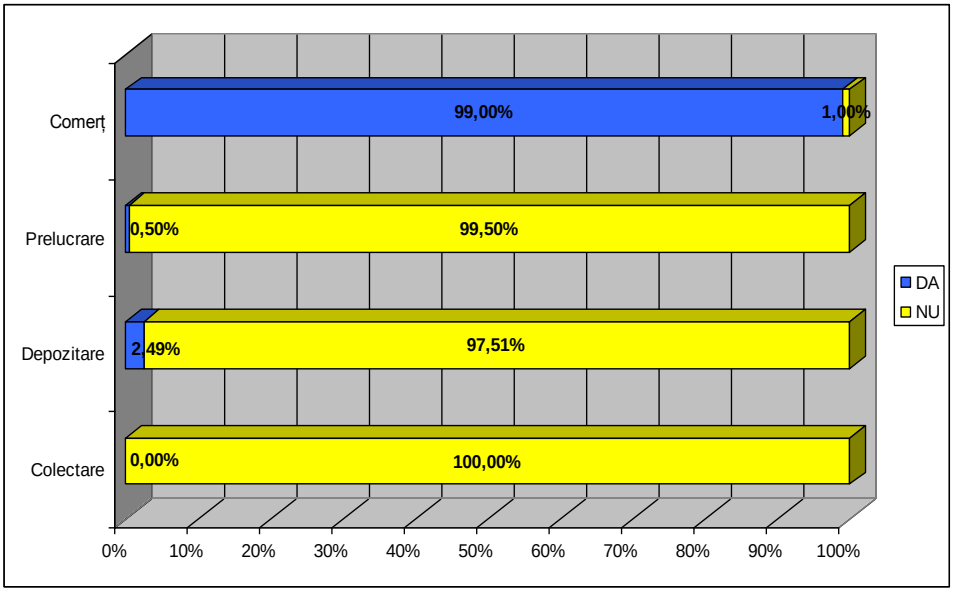
Amongst the questioned subjects none declared that they provide agricultural equipment services, however a few considered that they would dispose of the necessary resources.

96% of the interviewed subjects declared fruit/vegetable production as their main business, 56.7% of which are 100% dedicated to fruit/vegetable production. The relevance of the data resides in the fact that it proves the relevance of the sample group regarding the subject investigated and validates it as representative.

Further analysis of the data gathered shows that 8.81% of respondents (17 people) dedicate 30% of their agricultural activity to fruit/vegetable production, 8.81% (17 people) dedicate between 30% and 60% to fruit/vegetable production while the vast majority of respondents 82.38% (159 people) dedicate over 60% to this activity.

The structure of the chosen sample group is considered representative because the majority of the questioned subjects are directly involved in fruit/vegetable production, only 17% having grain cultivation as their main priority.

As for related agricultural activities (graphic 2) 99% of the respondents declared that they are engaged in commercial activities with the produced fruits/vegetables, 99.5% declared that they are not involved in processing products and only 2.49% have storage areas designed to deposit them. None declared to be involved in collecting products from other farmers.



Graphic no. 2- Percentage of the related agricultural activities

These percentages show that agricultural products are sold directly, without being processed (or even packed) by the producers.

Table no. 1

Analysis results for the size of agricultural surfaces

Cultivated area	Grains		Fruits		Vegetables	
	Number of subjects	Percentage	Number of subjects	Percentage	Number of subjects	Percentage
0 - 1 ha	15	7.5%	49	24.4%	102	50.7%
1 - 10 ha	34	16.9%	25	12.4%	5	2.5%
10 - 50 ha	17	8.5%	4	2%	0	0%
over 50 ha	17	8.5%	0	0%	0	0%
do not cultivate	125	62.2%	0	0%	0	0%

Study results show that the vast majority of those involved in fruit/vegetable production own agricultural surfaces less than 1 hectare, only a small percentage, of under 5%, own land between 1 and 10

hectares. Fruit production presents different results, 24.4% of owners having under 1 hectare of land, 12.4% between 1 and 10 hectares (mainly watermelon cultures) and only 2% own more than 10 hectares. This land distribution reinforces the idea that alone, without associations, those involved in fruit/vegetable production can not produce large enough quantities to negotiate with large markets (export, en-gross markets, and chain stores). In order to gain a better perspective on fruit and vegetable production diversity, but without aiming to present a definitive estimate on production size, the questionnaire included questions referring to vegetable/fruit kinds, the nature of the production process (field of greenhouse) and the estimated product quantity for 2011. Table 2 shows vegetable production taking into account the average size of the production lot, product groups, average production estimate, the percentage of vegetable/fruit producers from the total number of respondents and the desire to cultivate the same vegetables next year.

Tabel no. 2

Result analysis concerning vegetable product diversity on arable land

	Production on arable land				
	Average crop area (ha)	Average production amount (tons)	Number of producers	Producer percentage from number of respondents (%)	Continuing production (%)
1. Consumption and industrial tomatoes	0.095	1.53	50	24.88%	100.00%
2. capsicums, peppers	0.035	1.29	21	10.45%	100.00%
3. cucumbers	0.016	0.6	5	2.49%	100.00%
4. potatoes	0.018	0.6	14	6.97%	93.33%
5. green onions, onions, garlic	0.088	67.34	32	15.92%	100.00%
6. cauliflower, cabbage, , French turnip, salad, spinach, broccoli	0.165	77.8	75	37.31%	96.15%
7. carrots, parsley, celery, parsnip	0.073	46.95	39	19.40%	97.50%
8. beans, peas, eggplant	0.084	9.3	44	21.89%	100.00%
9. corn	0.467	6.16	12	5.97%	100.00%
10. watermelon	1.66	54	60	29.85%	96.77%

We can assert that most respondents cultivate cabbage varieties (37.31%) followed by watermelons (29.85%) onions (15.92%) and tomatoes (24.88%). Other vegetables fall in the 10% and under 10% however it is clear that a large variety of vegetables are produced on arable land. As for production continuity we can conclude that most producers want to cultivate the same type of vegetable, fact that invalidates the hypothesis of a significant dynamic in production, i.e. producers change next year's crop according to the current year's demand.

Table no. 3

Result analysis concerning vegetable product diversity in greenhouses

	Greenhouse production				
	Average crop area (m^2)	Average production amount for 2011 (tons)	Number of producers	Producer percentage from number of respondents (%)	Continuing production (%)
1. Consumption and industrial tomatoes	467	4.03	103	51.24%	94.17%
2. capsicums, peppers	307	1.22	66	32.84%	100.00%
3. cucumbers	245	1.07	31	15.42%	100.00%
4. potatoes	100	0.40	2	1.00%	100.00%
5. green onions, onions, garlic	86	43.00	21	10.45%	100.00%
6. cauliflower, cabbage, French turnip, salad, spinach, broccoli	215	0.85	39	19.40%	88.63%
7. carrots, parsley, celery, parsnip	156	0.79	33	16.42%	100.00%
8. beans, peas, eggplant	290	1.34	22	10.95%	91.00%

Greenhouse vegetable production (table 3) presents an increased diversity; production quantities though obtained on seemingly smaller surfaces, can be considered large as size standards are concerned.

The most cultivated vegetable in this category is the tomato (51.24%), followed by capsicums (32.84%) and cabbage varieties-mainly salad (19.40%). Yearly production fluctuation wise there are no important modifications, refuting the hypothesis that vegetable producers modify their production according to last year's demand.

Production stability (including the type of vegetable as well as the quantity) from one year to the other is beneficial for the producer because it constitutes a selection criterion for every collector wishing to gather the products in order to sell larger quantities to merchants.

Table nr. 4.

Result analysis concerning fruit product diversity

	Average crop area (ha)	Average production amount for 2011 (tons)	Number of producers	Producer percentage from number of respondents (%)	Continuing production (%)
Apples	16.65	304	6	2.99%	100.00%
Pears	0.1	0.3	2	1.00%	100.00%
Prunes	8.5	57.84	6	2.99%	100.00%
Apricots	0.2	0.3	2	1.00%	100.00%
Peaches	3.83	27.74	9	4.48%	100.00%
Nectarines	0.135	0.225	3	1.49%	100.00%
Cherries	2.1	12.3	4	1.99%	100.00%
Sour cherries	0.2	0.36	3	1.49%	100.00%
Grapes	0.79	137.77	19	9.45%	100.00%
Nuts	0	0	0	0.00%	0.00%
Almonds	0	0	0	0.00%	0.00%
Hazelnuts	0	0	0	0.00%	0.00%
Berries	0	0	0	0.00%	0.00%
Blackberries	0	0	0	0.00%	0.00%
Hackberries	0	0	0	0.00%	0.00%
Strawberries	0.01	300	1	0.50%	100.00%
Elder	0	0	0	0.00%	0.00%
Other	0	0	0	0.00%	0.00%

Based on a result analysis we can conclude that as far as fruit production is concerned, only grape producers have a significant percentage (9.45% of respondents) the rest of the fruits being cultivated by a number of producers that do not represent more than 5% of the respondents. Due to production technologies we cannot acknowledge yearly fruit variety fluctuations. There were no answers indicating a will to diversity production.

Conclusions

The most widespread form of property for fruit/vegetable farmers in Arad is the Agricultural farmer certificate (covering 97% of the sample group); there is also a direct, positive connection, none the less weak, between the property form and the number of people involved in the agricultural activity. The starting hypothesis according to which over 50% of farmers have as their main form of property the Agricultural farmer certificate was validated.

The vast majority of those involved in vegetable production own production surfaces less that 1 hectare, only a small group of 5% owning between 1 and 10 hectares. As for fruit production, 24.4% of those sampled own orchards smaller than 1 hectare, 12.4% registered with areas between 1 and 10 hectares (watermelon production) and only 2% own more than 10 hectares. This land distribution reinforces the idea that alone, without associations, those involved in fruit/vegetable production can not produce large enough quantities to negotiate with large markets (export, en-gross markets, and chain stores).

The hypothesis according to which vegetable/fruit producers typically own agricultural surfaces less than 1 hectare - 500 square meters for fruit producers respectively - was verified and validated.

As for product diversity it was proven that the entire range of vegetables is cultivated; fruit production on the other hand only covers half of the demand. The hypothesis according to which vegetable production varies yearly was disproved because 90% of the farmers (for each type of vegetable) manifested their intent to cultivate the same vegetable again.

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