

# ASSESSMENT OF THE PEDOCLIMATIC POTENTIAL FOR ECOLOGICAL VEGETABLE GROWING IN IASSY COUNTY

## EVALUAREA POTENȚIALULUI PEDOCLIMATIC PENTRU LEGUMICULTURA ECOLOGICĂ ÎN JUDEȚUL IAȘI

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**Abstract.** *Research carried out in six communes of Iassy county with largest area, greatest yields and a well-known tradition. The main criteria for assessment are based on emplacement of the vegetable fields and pedological and climatic characterizations. The results show that there are very favourable conditions for onion, carrot, cabbage, cucumber and leafy vegetable crops and favourable conditions for thermophilic vegetable as tomato, pepper and egg plant crops.*

**Rezumat.** *Cercetările au fost realizate în șase comune din județul Iași cu cele mai mari suprafețe și producții de legume și cu o tradiție recunoscută. Au fost culese informații privind amplasamentul terenurilor legumicole, caracterizarea pedologică și climatică, în comparație cu un standard optim. Rezultatele demonstrează că sunt întrunite condiții foarte favorabile pentru culturile ceapă, morcov, varză, castraveți și legume verdețuri și favorabile pentru legumele termofile ca tomate, ardei și pătlăgele vinete.*

Iași county, although situated in north-eastern hilly area of România, has great possibilities for vegetables growing, a few microzones like those around Tg. Frumos town or those from Lunca Prutului became traditional zones.

In the last years, 12000 hectares have been cultivated with vegetables, in Iași county, obtaining over 13-14 t/ha of average production (Statistical Yearbook of Romania, 2005).

Onion, garlic, carrot, parsley, cabbage, cucumber, pepper and tomato crops find extremely favourable conditions in traditional microzones.

The main propitious factors for a sustainable development of a vegetable crop are: environmental conditions, tradition and know-how as well as a good market (towns of Iași, Pașcani, Tg. Frumos, Huși and Hîrlău).

These circumstances generated the idea of assessing the promoting possibilities for the ecological vegetable crops. Following the technical exigencies demanded by this system. In this paper, the evaluation of the pedoclimatic potential belonging to this vegetables production was proposed.

## MATERIAL AND METHOD

The researches were carried out in six places from Iași county: Belcești, Bosia, Focuri, Golăești, Răducăneni and Tg.Frumos. The tradition as well as the area and relatively high yield were the criterions for choosing this places. The assessment of the pedoclimatic potential for vegetable yield has been made using the informations regarding the location of the vegetable plots, pedological and climatic characterization compared to an optimum standard.

Data collection was carried out by field documentation using pedological and climatic data from the pedological and agrochemical county's offices but also from the nearest weather station.

## RESULTS AND DISCUSSIONS

The importance of the vegetables grown in the studied communes occurs from table 1.

*Table 1*

**Vegetable yield in by communes**

<b>Commune</b>	<b>Total surface (ha)</b>	<b>Total yield (t)</b>	<b>Average yield (kg/ha)</b>	<b>Main cultures (ha)</b>
Belcești	500	8658	17315	Tomatoes (75), carrot (55), onion (80)
Bosia	245	3029	12367	Cabbage (50), pepper (40), onion (25)
Focuri	289	3893	13471	Onion (50), cabbage (50), tomatoes (40)
Golăești	241	3670	15245	Tomatoes (40), cabbage (40), pepper (40)
Răducăneni	320	4535	14173	Tomatoes (60), cabbage (60), onion (30), cucumber (30)
Tg. Frumos	250	4473	17891	Carrot (50), cabbage (50), cucumber (30)

Technical information regarding the placement and the cultivation system occurs from table 2.

Table 2

**Placement and cultivation systems used in communes**

Commune	Placement				Cultivation systems		
	meadow	terrace	plateau	easily flooded soil	field	polytunnel	greenhouse
Belcești	x	x	x	x	x	x	
Bosia	x	x	x	x	x	x	x
Focuri	x	x	x	x	x	x	x
Golăești	x	x	x	x	x	x	x
Răducăneni	x	x	x	x	x	x	x
Tg. Frumos	x	x	x	x	x	x	x

Vegetable crops from the studied communes are on meadow lands, often on easily flooded lands and also on terraces and plateaus. The vegetables are cultivated mainly in the fields, followed by polytunnels (the biggest area in Tg. Frumos) and much more less in greenhouses (under 2,5 ha).

The pedological characterization of the cultivated fields occurs table 3.

Table 3

**Pedological characterization of vegetable fields**

Location	Geomorphology	Lithology	Soil type	
			Name	Characteristics
Belcești	hills and hillocks with valleys and meadows in between	loess deposits	chernozem rich in humus carbonaceous	loam-clayey texture
			chernozems	loam-clayey texture
			alluvium soils	loam-clayey texture
Bosia	Lunca Prutului, terraces I and II	alluvial deposit	solonetz on fluvial materials	clayey texture
			epicalcaric chernozems	loam-clayey texture
			carbonaceous chernozem	loam-clayey texture
Focuri	fragmentated plateau with aspect of a hill and meadow	loess deposits	epicalcaric chernozems	medium loam texture
			mezocalcaric cambic chernozems	medium loam texture

Location	Geomorphology	Lithology	Soil type	
			Name	Characteristics
Golăești	Lunca Prutului, terraces I and II	alluvial deposit	alkali soil on fluvial materials	clay-loam texture
			epicalcaric rich in humus chernozems	loam-clayey texture
			carbonaceous rich in humus chernozem	loam-clayey texture
Răducăneni	medium altitude plateau, low-medium fragmented	Loess deposits, gault clay, sandstone and sands	cambic chernozems	loam texture
			mezocalcaric cambic chernozems	loam texture
Tg. Frumos	hills and hillocks with valleys and meadows in between	loess deposits	mezocalcaric cambic chernozems	loam-clayey texture
			proxycalcaric chernozems	loam-clayey texture
			epicalcaric rich in humus chernozems	loam-clayey texture

By geomorphological point of view, the vegetables fields are located on meadows and their terraces, but also on valleys, on hill slopes or divided plateaus. Because of that, the fields are parceled into relatively small areas owing good geomorphological conditions.

Soils mainly developed on loess deposits, by assuring them a typical evolution. In Lunca Prutului, Bosia and Golăești communes, the deposit is alluvial.

The main soil types are high quality chernozems (in different ways of evolution). In the meadows there are typical soils like solonetz on fluvial materials, known as very fertile soils able to sustain vegetables growth.

Soils texture is mainly loam-clayey with different evolutionary layers. This texture favors the crust developing and confers a middle to hard characteristic.

The vegetable crops sown directly in soil (leafy green vegetables, peas, beans, onion) need special tilling methods for crust control and, then, for loosening the soil.

Climate characterization is specific to the north-eastern romanian area: a temperate continental climate with severe winters and warm summers often droughty. The microclimate main elements of studied communes are presented in table 4.

Table 4

## Characterization on the communes microclimat

Location	The annual average temperature (°C)	The annual precipitation (mm)	Potential evapotranspiration (mm)	Aridity factor	Average data		Extreme data			
					The first frost	The last frost	The first frost		The last frost	
							The earliest	The latest	The earliest	The latest
Belcești	9,6	475	675	28	15.10	17.04	10.09	25.11	2.03	21.05
Bosia	9,6	518	675	26	15.10	17.04	10.09	25.11	2.03	21.05
Focuri	9,2	466	665	24,4	15.10	17.04	10.09	25.11	2.03	21.05
Golăești	9,6	518	675	26	15.10	17.04	10.09	25.11	2.03	21.05
Răducăneni	9,5	523	672	27	15.10	17.04	10.09	25.11	2.03	21.05
Tg. Frumos	9,6	475	675	29	15.10	17.04	10.09	25.11	2.03	21.05

The annual average temperature varies around 9,6°C, without obvious differences. Amount of precipitation is quite different, the annual average values are between 466 mm (Focuri) and 523 mm (Răducăneni). By comparing it with the annual evapotranspiration of 670 mm, the result is that the area is generally drought-stricken and some of the vegetable crops can suffer from, but at the same time, ensure conditions less favourable for the appearance and development of the diseases.

The unfavourable meteorological accidents coast by temperature are relatively reduced. The last frost (in spring) is around 17.04 and the first frost (in autumn) appears near 15.10, resulting a period of more or less six months (181 days) without frost.

Compared with the average values, the latest frost was on 21.05 and the earliest on 10.09, so the thermophile vegetables (tomatoes, peppers, eggplants, beans) are damaged or even destroyed.

## CONCLUSIONS

1. Vegetables crop from the six studied communes is carried out mainly in the field and then in polytunnels (Tg. Frumos);
2. The fields, wich is practised vegetable growing, are fragmented in relatively small areas, but with good conditions in terms of geomorphologic, fertile soil, suitable for ecological system
3. By climatic point of view, during the growing season, the drought-stricken areas can seriously affect some vegetable crops;
4. The meteorological accidents coast by temperature are relatively reduced, but when occuring can affect or even destroy the termophilic vegetables;
5. In general, the conditions are very favourable for crops like onion, carrot, cabbage, cucumber and leafy green vegetables and favourable for termophilic vegetables as tomatoes, peppers and eggplants.

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