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# The production cost of sheep milk in intensive and extensive breeding farms in Greece

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GREECE

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# OBJECTIVES OF THE STUDY

- To estimate the production cost of sheep milk in Greece
- To identify the main elements of the production cost
- To assess the economic performance of sheep farms
- To estimate the effect of farm structure on the production cost of sheep milk

*therefore*



the analysis is undertaken in extensive and intensive farming systems identified in Continental Greece

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# SHEEP FARMING IN GREECE

- 1% of the world population of sheep (9.000.000 sheep)
- High contribution in the country's gross agricultural production value and in rural development
- Sheep milk accounts for more than 36% of the total milk production\*
- The majority of farms:
  - Produce both milk and meat but 60% of the gross revenue comes from milk
  - High degree of diversification



- Differences in the production cost appear
- Different strategies for their reduction is required

\* National Statistical Service of Greece, 2006

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# DATA: FIELD RESEARCH

**Detailed data on 150 farms located in two areas:**

1. Etoloakarnania, Western Greece
2. Serres, Drama, Macedonia

**Stratified random sample, according to:**

- Livestock size
- Morphological characteristics of the area

**Data on:**

- Farmer characteristics
  - Inputs
  - Labour (crop and livestock activities)
  - Capital (land, buildings, equipment, livestock)
  - Price and Yields
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# METHODS

- **1<sup>st</sup> step:** Identification of farm types using multivariate analysis (Factor, cluster)
- **2<sup>nd</sup> step:** Estimation of the main elements of the farm expenses
- **3<sup>rd</sup> step:** Estimation of the production cost of milk

Other indices of the **economic performance of the** dairy sheep farming activity were estimated

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# METHODS: MULTIVARIATE ANALYSIS

## 1<sup>st</sup> Step: Factor analysis

- Farm size
- Intensity
- Production orientation
- Farmer Characteristics

## 2<sup>nd</sup> Step: Cluster analysis

- Size relative to land
  - Size relative to labour, capital, economic performance
  - Crop production
  - Other livestock activities
  - Gross margin/LU
  - Farmer characteristics
  - Livestock feeding
  - Intensity in terms of capital
  - Non – agricultural income
  - Milk production, yield
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# METHODS: ESTIMATION OF THE PRODUCTION EXPENSES

## 1. Land Expenses



1. Owned
2. Rented land  
for: Fodder production  
Pasture and other land

## 2. Labour Expenses



1. Permanent (family, hired)-Fixed cost
2. Casual (hired)-Variable cost

## 3. Variable Capital Expenses



1. Livestock  
Purchased feed cost etc.
2. Fodder production  
Fertilizers, pesticides etc

## 4. Fixed Capital Expenses



1. Buildings and equipment
  2. Livestock  
Depreciation, interest,  
maintenance, insurance
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# METHODS: PRODUCTION COST AND OTHER INDICATORS

## 1. Production Cost of Milk

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1<sup>st</sup> step. Distribute expenses to milk and meat produced, according to their production value (see Kitsopanides, 2006)

2<sup>nd</sup> step. Estimate production cost according to the quantity of produced milk

## 2. Gross margin, profit

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Gross margin = Revenue – Variable cost

Net revenue (Profit) = Revenue – Total cost

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# METHODS: BREAK EVEN YIELD AND PRICE

## 1. Break even yield

$$\text{Break even Yield} = \frac{\text{Total Variable Cost}}{\text{Price}}$$

## 2. Break even price

$$\text{Break even Price} = \frac{\text{Total Variable Cost}}{\text{Quantity}}$$

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# RESULTS: FARM TYPOLOGY

- **Semi-intensive farms** → 35%, sheep farms, 74 ewes, 144 l/ewe, on-produced feed
  - **Part-time farmers** → 9%, off-farm income, 47 ewes, diversified farming, purchased feed, hired labour, 103 l/ewe, meat production
  - **Extensive farms** → 25%, sheep farms, 127 ewes, 100 l/ewe, high dependence on subsidies, rented pastureland, low capital utilization
  - **Crop-livestock farms** → 14%, diversified farming, 89 ewes, high consumption of concentrates, 146 l/ewe, high invested capital
  - **Intensive** → 8%, sheep farms, 344 ewes, high invested capital, supplementary feeding, 219 l/ewe
  - **Mixed livestock farms** → 9%, diversified livestock farms, 161 ewes, extensive breeding, purchased feed, pastureland, 120 l/ewe
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# RESULTS: PRODUCTION EXPENSES (1)

	Extensive farms		Semi-intensive farms		Intensive farms	
	Mean	%	Mean	%	Mean	%
<b>Total Fixed Cost (€)</b>	<b>10.301,71</b>	<b>46,05</b>	<b>6.235,33</b>	<b>52,50</b>	<b>32.643,69</b>	<b>51,20</b>
Land Cost (€)	1.705,71	7,62	1.333,53	11,23	5.648,46	8,86
<i>Land Cost (Fodder) (€)</i>	<i>1.304,05</i>	<i>5,83</i>	<i>1.036,99</i>	<i>8,73</i>	<i>5.193,46</i>	<b>8,15</b>
Labour Cost (permenant) (€)	4.717,06	21,08	2.837,58	23,89	5.888,25	9,23
Fixed Capital Cost (€)	3.878,93	17,34	2.064,22	17,38	21.106,98	<b>33,10</b>
<b>Valiable Cost (€)</b>	<b>12.071,30</b>	<b>53,95</b>	<b>5.640,80</b>	<b>47,50</b>	<b>31.116,60</b>	<b>48,80</b>
<b>Total Production Cost (€)</b>	<b>22.372,99</b>	<b>100,00</b>	<b>11.876,13</b>	<b>100,00</b>	<b>63.760,33</b>	<b>100,00</b>
% of the Milk Production Cost / Total cost	14.089,44	62,98	7.602,90	64,02	45.372,98	<b>71,16</b>

# RESULTS: PRODUCTION EXPENSES (2)

	Part-time farmers		Crop-livestock farms		Mixed livestock farms	
	Mean	%	Mean	%	Mean	%
<b>Total Fixed Cost (€)</b>	<b>3.613,26</b>	<b>42,92</b>	<b>9.534,06</b>	<b>49,31</b>	<b>9.198,62</b>	<b>37,93</b>
Land Cost (€)	486,75	5,78	1.892,20	9,79	1.777,19	7,33
<i>Land Cost (Fodder) (€)</i>	<i>296,84</i>	<i>3,53</i>	<i>1.492,06</i>	<i>7,72</i>	<i>1.717,92</i>	<i>7,08</i>
Labour Cost (permenant) (€)	2.116,90	<b>25,15</b>	4.029,33	20,84	3.697,02	15,24
Fixed Capital Cost (€)	1.009,60	11,99	3.612,52	<b>18,68</b>	3.724,41	15,36
<b>Valiable Cost (€)</b>	<b>4.805,14</b>	<b>57,08</b>	<b>9.800,23</b>	<b>50,69</b>	<b>15.053,20</b>	<b>62,07</b>
<b>Total Production Cost (€)</b>	<b>8.418,40</b>	<b>100,00</b>	<b>19.334,28</b>	<b>100,00</b>	<b>24.251,79</b>	<b>100,00</b>
% of the Milk Production Cost / Total cost	4.509,91	53,57	13.454,96	69,59	15.709,53	64,78

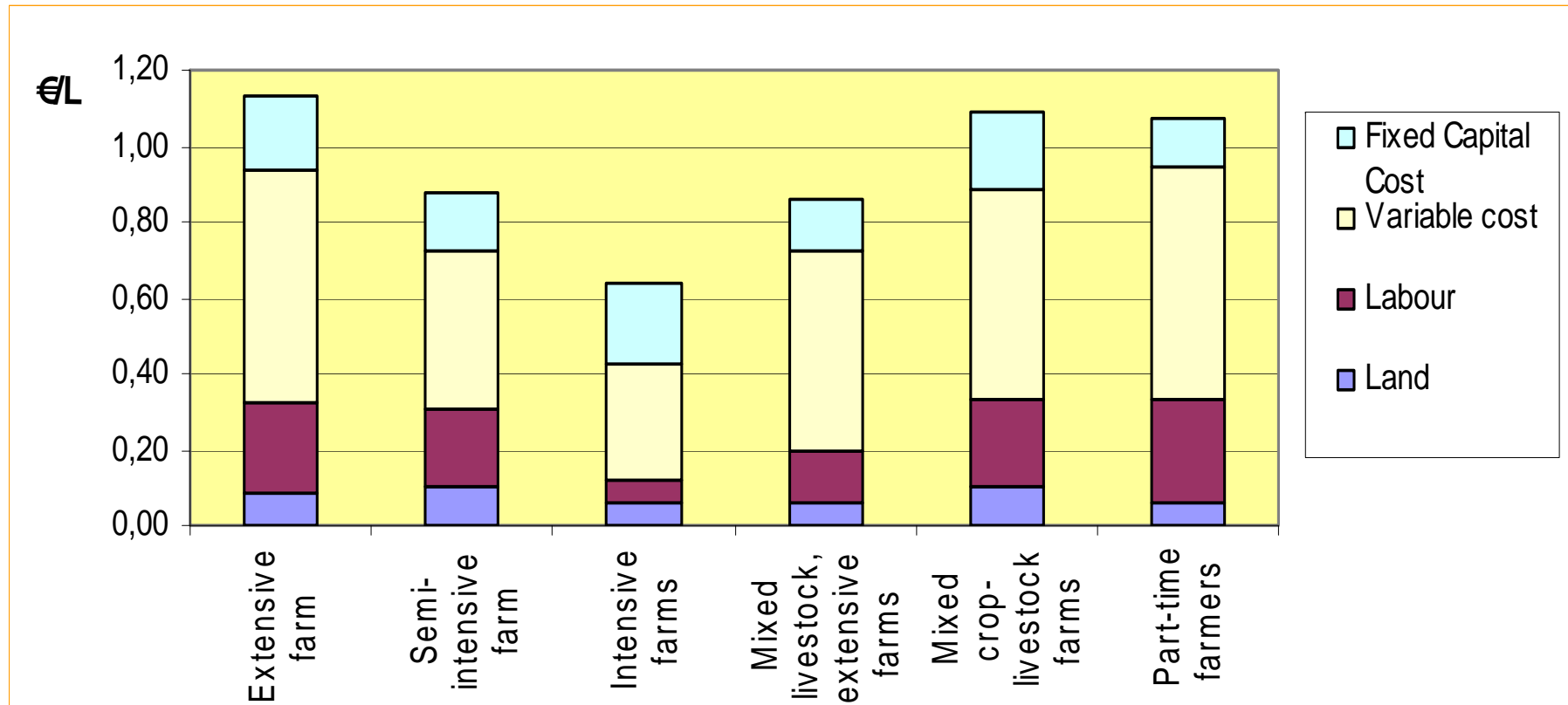
# RESULTS: PRODUCTION COST OF MILK (1)

	Extensive farm		Semi-intensive farm		Intensive farms	
	Total (€)	€/l of milk	Total (€)	€/l of milk	Total (€)	€/l of milk
Land Cost	1.074	0,09	854	0,10	4.020	0,06
Labour Cost	2.971	0,24	1817	0,21	4.190	0,06
Variable Cost	7.601	0,61	3611	0,42	22.143	0,31
Fixed Capital Cost	2.443	0,20	1321	0,15	15.020	0,21
<b>Total Cost</b>	<b>14.089</b>	<b>1,14</b>	<b>7603</b>	<b>0,88</b>	<b>45.373</b>	<b>0,64</b>
Milk revenue	12.000	0,90	8913	0,9	67.600	0,95
<b>Gross margin</b>	<b>4.399</b>	<b>0,29</b>	<b>5302</b>	<b>0,48</b>	<b>45.457</b>	<b>0,64</b>
<b>Profit</b>	<b>-2.089</b>	<b>-0,24</b>	<b>1310</b>	<b>0,02</b>	<b>22.227</b>	<b>0,31</b>

# RESULTS: PRODUCTION COST OF MILK (2)

	Part-time farmers		Mixed crop-livestock farms		Mixed livestock farms	
	Total (€)	€/l of milk	Total (€)	€/l of milk	Total (€)	€/l of milk
Land Cost	261	0,06	1.317	0,11	1.151	0,06
Labour Cost	1.134	0,27	2.804	0,23	2.395	0,13
Variable Cost	2.574	0,61	6.820	0,55	9.751	0,53
Fixed Capital Cost	541	0,13	2.514	0,20	2.413	0,13
<b>Total Cost</b>	<b>4.510</b>	<b>1,07</b>	<b>13.454</b>	<b>1,09</b>	<b>15.710</b>	<b>0,85</b>
Milk revenue	4.079	0,89	11.900	0,90	16.600	0,88
<b>Gross margin</b>	<b>1.504</b>	<b>0,28</b>	<b>5.080</b>	<b>0,35</b>	<b>6.849</b>	<b>0,33</b>
<b>Profit</b>	<b>-383</b>	<b>-0,18</b>	<b>-554</b>	<b>-0,19</b>	<b>890</b>	<b>0,03</b>

# RESULTS: PRODUCTION COST OF MILK (3)





# RESULTS: VARIABLE COST OF MILK (1)

	Extensive farms		Semi-intensive farms		Intensive farms	
	€/l of milk	%	€/l of milk	%	€/l of milk	%
<b>Total Feed Cost</b>	<b>0,55</b>	<b>90</b>	<b>0,38</b>	<b>90</b>	<b>0,27</b>	<b>87</b>
<b>Cost of Purchased Feed</b>	<b>0,35</b>	<b>58</b>	<b>0,21</b>	<b>51</b>	<b>0,15</b>	<b>48</b>
<i>Concentrates</i>	0,25	42	0,14	33	0,13	41
<i>Hay-Silage</i>	0,10	17	0,08	18	0,02	6
<b>On-produced Feed</b>	<b>0,19</b>	<b>31</b>	<b>0,16</b>	<b>39</b>	<b>0,12</b>	<b>39</b>
<i>Concentrates</i>	0,10	16	0,09	22	0,08	26
<i>Hay-Silage</i>	0,09	15	0,07	17	0,04	13
Other (salt etc)	0,01	1	0,00	0	0,00	1
Veterinary Cost	0,03	5	0,02	4	0,03	8
Casual Hired Labour	0,00	0	0,00	1	0,00	0
Variable Cost Interest	0,01	2	0,01	2	0,01	2
<b>Total Variable Cost</b>	<b>0,61</b>	<b>100</b>	<b>0,42</b>	<b>100</b>	<b>0,31</b>	<b>100</b>

# RESULTS: VARIABLE COST OF MILK (2)

	Part-time farmers		Crop-livestock farms		Mixed livestock farms	
	€/l of milk	%	€/l of milk	%	€/l of milk	%
<b>Total Feed Cost</b>	<b>0,55</b>	<b>89</b>	<b>0,48</b>	<b>88</b>	<b>0,48</b>	<b>91</b>
<b>Cost of Purchased Feed</b>	<b>0,46</b>	<b>76</b>	<b>0,27</b>	<b>49</b>	<b>0,36</b>	<b>67</b>
<i>Concentrates</i>	0,23	38	0,18	33	0,24	46
<i>Hay-Silage</i>	0,23	38	0,09	16	0,11	21
<b>On-produced Feed</b>	<b>0,08</b>	<b>13</b>	<b>0,21</b>	<b>38</b>	<b>0,13</b>	<b>24</b>
<i>Concentrates</i>	0,05	8	0,13	23	0,07	14
<i>Hay-Silage</i>	0,03	4	0,08	15	0,06	10
Other (salt etc)	0,00	1	0,00	1	0,00	0
Veterinary Cost	0,02	3	0,03	6	0,03	6
Casual Hired Labour	0,00	0	0,01	1	0,00	0
Variable Cost Interest	0,01	2	0,01	2	0,01	2
<b>Total Variable Cost</b>	<b>0,61</b>	<b>100</b>	<b>0,55</b>	<b>100</b>	<b>0,53</b>	<b>100</b>

# RESULTS: BREAK EVEN POINTS

	Extensive farms	Semi-intensive Farms	Intensive Farms	Part-time Farmers	Mixed - crop Farms	Mixed Livestock Farms
Milk/ewe	100	144	219	103	146	120
Price (€/l)	0,90	0,90	0,95	0,89	0,90	0,88
Variable cost (€/ewe)	61	60	68	63	80	64
<b>Break even Yield (l)</b>	<b>68</b>	<b>67</b>	<b>72</b>	<b>71</b>	<b>89</b>	<b>73</b>
<b>Break even Price (€/l)</b>	<b>0,61</b>	<b>0,42</b>	<b>0,31</b>	<b>0,61</b>	<b>0,55</b>	<b>0,53</b>

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# CONCLUSIONES (1)

The 6 farm types have common characteristics:

- ❑ Main element of the production cost → feed cost
- ❑ Positive gross margin

Extensive farms

- ❑ Variable cost is the main element of their cost
  - ❑ Use purchased fodder
  - ❑ Smaller land cost, they utilize low productivity land
  - ❑ Negative net return, when size is small
  - ❑ They are labour intensive
  - ❑ Produce milk and meat (especially part-time farmers)
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# CONCLUSIONES (2)

## Intensive farms:

- ❑ Reduced production cost (50%)
  - ❑ Smaller variable cost (feed cost)
  - ❑ Land costs refer mainly to fodder production
  - ❑ Specialize on milk production
  - ❑ Capital intensive (high fixed capital cost)
  - ❑ Positive net return when they specialize on sheep farming
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## Also:

Mixed crop-livestock farms face higher production cost

Production of fodder lowers cost

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# CONCLUSIONS (3)

Extensive farms should → Increase size, lower cost

Intensive farms should → On-produce fodder, increase yield

Subsidies are important for more extensive breeding farms to yield a positive net return

*Also:*

Farms face uniform milk price  
- Higher only in the case of intensive farms

Heterogeneity of the production cost – Farmers can adjust their structural characteristics to increase profit

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Thank you for your attention!

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**IDF International Symposium on  
Sheep, Goat and other non-Cow Milk  
Athens, Greece, 16-18 May**

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