

Economic sustainability and financial performance of agro-pastoral systems

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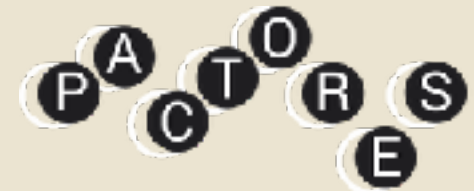
11-12 March 2021



Many questions for farmers

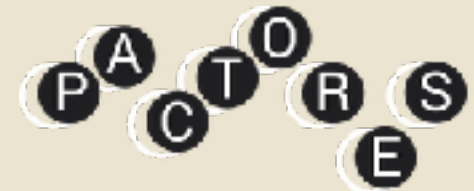
- How much will I make?
- What will be my income?
- Will my farm be viable and survive in the future?

- What should I fix in the operation of my farm?
- Why not look for a job elsewhere?
- What will happen if subsidies stop?
- Should I leave pastoral production?



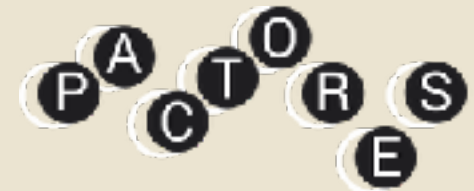
Financial results

- Measures of the productivity and economic performance of farms
- Based on financial results, strengths and weaknesses are detected and specific remedial measures are proposed
 - Farm level
 - Local/Regional level
 - Farming system level



Basic financial results

- Gross revenue
 - Production expenses
 - Net profit (loss)
 - Return to land
 - Return to labor
 - Capital return
- Farm income
 - Farm family income
 - Gross margin



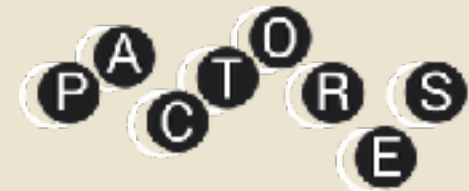
Gross revenue (1)

- The total product of a farm – as a result of the production process – produced in a specific period and expressed in money

Gross revenue =

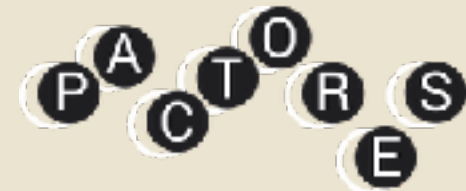
Price X Quantity + **Subsidies** + Compensation

- Gross revenue includes the value (money) of
 - All products (primary or manufactured) sold to markets/consumers
 - Products used/given as fee/remuneration (e.g. for rent)
 - Products consumed by the farm family
 - Products stored to be used in the farm in a future period (e.g. seeds for the next seeding)
 - Increase in inventory
 - Replacement animals



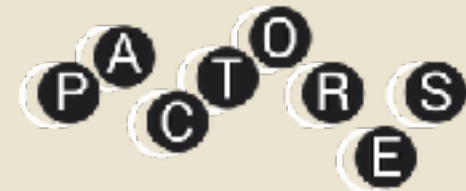
Gross revenue (2)

- Gross revenue does NOT include the value of
 - Increases in livestock
 - Increases in permanent crops
 - **Intermediate products** (e.g. feedstuff produced on-farm)
 - What about subsidies?
- **Gross revenue is the fundamental financial result**
 - Shows the productivity of the farm
 - Shows the total cash inputs of the farm
 - Provides the basis to calculate other financial results



Production expenses (1)

- All types of expenses/sacrifices made within a production process that leads to one or more products
- Includes the implicit or paid remuneration/value/cost of production inputs
- Can be expressed (like all other indicators and/or financial results)
 - Per year
 - Per animal or per ha
 - Per 1000 of revenue
- Importance
 - Key criterion for rational decision-making
 - Detection of weaknesses in the organization of farms
 - Practices and/or management decisions that need to be revised/reorganized



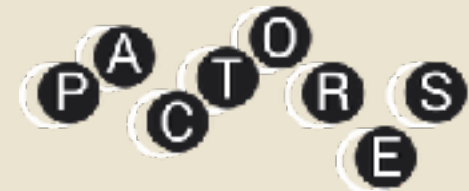
Expenses expressed per production input

- Land

- Rented land: Paid rent (money or in kind)
- Own land: Implicit rent (usually calculated as a percentage of the market value of land)

- Human labor

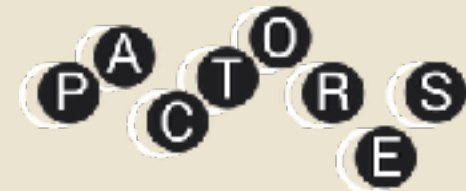
- Family labor: Implicit wage
 - All family members - working full-time or part-time
 - 1 Labor Unit (LU) - 1720h/year
- Hired labor: Paid salaries
- Are there implications on the family character of a farm?



Expenses expressed per production input

- **Capital expenses**

- *Fixed capital (buildings, machinery, land reclamation, livestock, permanent crops)*
 - Depreciation
 - Interest (fixed AND variable capital)
 - Insurance
 - Maintenance
- *Variable capital*
 - Crop production
 - Consumables: Seeds, agrochemicals, fuel, drugs, purchased feedstuff, energy, other consumables
 - Irrigation – Veterinary expenses
 - Hired machinery (e.g. seeding, harvesting, cleaning of facilities, livestock transport)
 - On-farm manufacturing (e.g. consumables for cheese production and packaging)

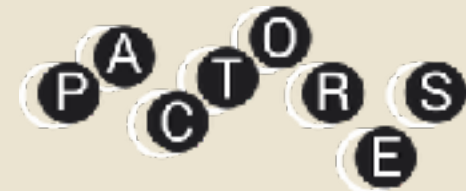


Net profit (Loss)

- The PROFIT (additional remuneration) from the use of inputs in the production process (in excess to the costs of their use)
- Profit is achieved only if the combination of production factors is successful (*efficient*)
 - Includes the remuneration of the farmer/entrepreneur
- If production factors are not combined successfully – Net loss!!

$$\text{Net profit (loss)} = \text{Gross revenue} - \text{Total expenses}$$

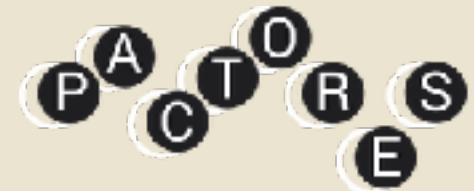
- Importance
 - Reflects one of the basic purposes of farms (profitability)
 - The most important (?) financial result for market-oriented farms
 - Basic indicator of efficiency and economic performance
 - Reveals the long-term prospects of farms



Return to land

- Shows if land is used in a profitable way in the farm
- Provides a basis to calculate land rent in an area
- Basis to calculate land values in an area

$$\text{Return to land} = \text{Rent (Implicit or paid)} + \text{Profit (-Loss)}$$

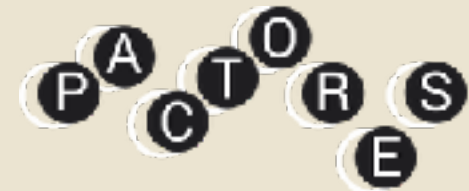


Return to labor (Labor wage)

- Shows if working on the farm is lucrative – Can be compared to wages in other sectors of the local economy
- Shows how the ‘free’ family labor is used efficiently and if there is room for better use
 - Can the farm survive harsh conditions by firing hired workers – if necessary?
- Is hired labor better or should family labor be preferred?
- Δείχνει τις απαιτήσεις εργασίας ανά φυσική μονάδα (π.χ. ανά προβατίνα) και βοηθά διαχειριστικές αποφάσεις

Return to labor =

Labor expenses (Family or hired) + Net profit (-Loss)

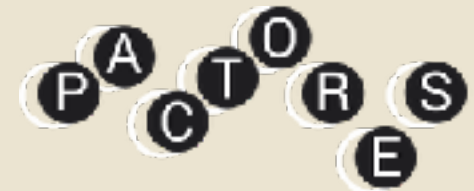


Return to capital

Return to capital =

$$[\text{Rent} + \text{Interest} + \text{Net profit (-Loss)}] / [\text{Value of land} + \text{Total capital invested}]$$

- Importance
 - Permits comparison among enterprises
 - Comparison to other alternative economic activities
 - Comparison to the cost of capital (i.e. loan interest rates)

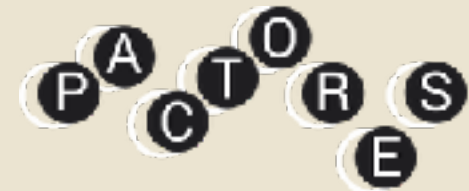


Farm income

- The remuneration of the combined use of inputs in a farm
 - The excess part of gross revenue which can be withdrawn without serious problems
 - Reflects the part of the gross revenue which is available to farmers
 - Reflects the standards of living – Especially in traditional farms
 - Stands for the amount up to which a farmer has adequate liquidity and will not have to borrow

Farm income =

Rent (Implicit and/or paid) + Labor wage (Family and/or hired) + Interest + Net profit (loss)

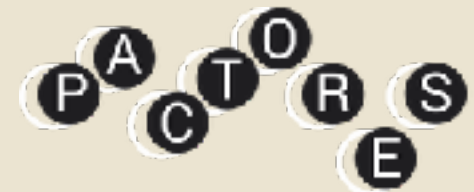


Gross margin

- The part of the gross revenue which remains to cover the fixed (pre-existing) expenses of a farm

Gross margin = Gross revenue – Variable expenses

- Importance
 - Shows how the farm is dependent/indebted and able to cover current expenses
 - Shows if the farm is viable in the short term
 - Shows the liquidity of the farm
 - Often used in mathematical modelling (e.g. Linear Programming)

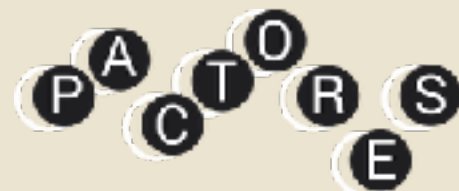


SOUTH EUROPEAN SOCIETY AND POLITICS, 2016
<http://dx.doi.org/10.1080/13608746.2016.1164916>

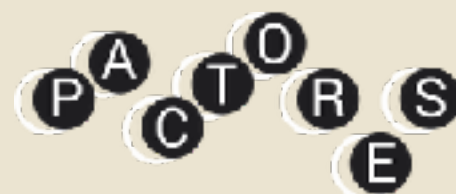
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In Search of Strategies to Face the Economic Crisis: Evidence from Greek Farms

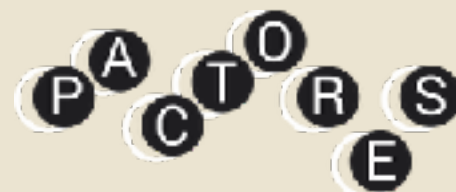
Athanasios Ragkos, Stavriani Koutsou and Theodoros Manousidis



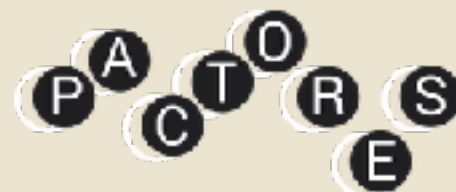
	2010	2014
Total number of farms	41	41
Number applying grazing	34	41
Average flock size (ewes/farm)	243.8	218.6
Milk production per year		
Average (tonnes/farm)	34.8*	28.1*
Milk yield (kg/ewe)	142.7*	128.6*
Average milk price (€/kg)	0.91	0.92
Lamb meat production per year		
Average (kg/farm)	1,715.6*	1,482.3*
Average lamb meat price (€/kg)	4.45*	4.92*
Cultivated land (hectares/farm)		
Non-irrigated	7.04	6.46
Irrigated	7.11*	5.24*
Labour requirements (hours/ewe)		
Family	20.6*	26.8*
Hired	7.2*	2.0*



	2010			2014		
	Expenses per farm(€)	€/ewe	% of total expenses	Expenses per farm(€)	€/ewe	% of total expenses
Land rent	4,947.0	20.3	6.4	3,581.9	16.4	4.7
Labour expenses	18,620.1	76.4*	23.9	18,497.2	84.6*	24.5
Family labour	15,322.9	62.8*	19.7	17,569.2	80.4*	23.3
Hired labour	3,297.2	13.5*	4.2	928.1	4.2*	1.2
Capital expenses	54,199.5	222.3*	69.7	53,344.2	244.0*	70.7
Variable capital	28,891.0	118.5*	37.2	28,035.7	128.2*	37.2
Feedstuff expenses	22,437.8	92.0*	28.9	22,412.4	102.5*	29.7
Other variable expenses	6,453.2	26.5	8.3	5,623.3	25.7	7.5
Fixed capital	25,308.5	103.8	32.5	25,308.5	115.8	33.6
Total production expenses	77,766.6	319.0*	100.0	75,423.3	345.0*	100.0

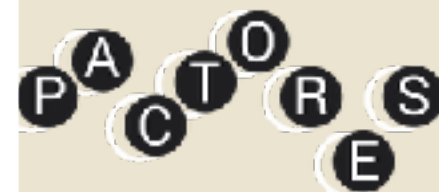


Financial results ^a	2010		2014	
	€	€/ewe	€	€/ewe
Gross output	43,150.1	177.0*	33,525.3	153.4*
Production expenses	77,766.6	319.0*	75,423.3	345.0*
Net profit/loss	-34,616.5	-142.0*	-41,898.0	-191.6*
Gross profit	14,259.1	58.5*	4,990.9	22.8*
Farm income	-8,648.6	-35.5*	-17,418.9	-79.7*



		2010			2014		
		Coefficient	<i>t</i> statistic	Marginal product	Coefficient	<i>t</i> statistic	Marginal product
Constant (<i>a</i>)		13.118**	1.972		0.380	0.598	
Outputs	Gross output (<i>Y</i>) (€)						
Inputs	Labour (<i>X</i> ₁) (h)	0.357**	1.976	2.27 €/h	0.603	2.791***	3.21 €/h
	Variable capital (<i>X</i> ₂) (€)	0.664***	5.251	0.99 €/€	0.773	5.089***	0.92 €/€
	Fixed capital (<i>X</i> ₃) (€)	-0.188*	-1.673		-0.188	-1.309	
Goodness-of-fit	<i>R</i> ²	0.811			0.795		
	<i>F</i> -test (df [†])	53.008 <i>p</i> -value(3) < 0.000			17.705 <i>p</i> -value(3) < 0.001		

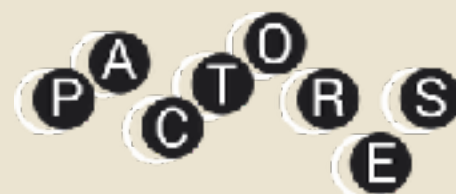
Efficiency scores	CRS						VRS					
	2010			2014			2010			2014		
	Farms	%	Mean TE	Farms	%	Mean TE	Farms	%	Mean TE	Farms	%	Mean TE
1.000	5	12.2	1.00	4	9.8	1.00	10	24.4	1.00	10	24.4	1.00
0.900-0.999	2	4.9	0.96	3	7.3	0.93	7	17.1	0.95	6	14.6	0.93
0.800-0.899	3	7.3	0.85	1	2.4	0.82	5	12.2	0.84	2	4.9	0.82
0.700-0.799	9	22.0	0.75	3	7.3	0.77	5	12.2	0.74	3	7.3	0.77
0.600-0.699	5	12.2	0.63	7	17.1	0.64	11	26.8	0.66	11	26.8	0.66
0.500-0.599	5	12.2	0.54	5	12.2	0.56	3	7.3	0.52	5	12.2	0.52
0.400-0.499	8	19.5	0.46	8	19.5	0.46	-	-	-	3	7.3	0.50
0.300-0.399	2	4.9	0.38	4	9.8	0.35	-	-	-	1	2.4	0.37
0.200-0.299	2	4.9	0.25	5	12.2	0.28	-	-	-	-	-	-
0.100-0.199	-	-	-	1	2.4	0.19	-	-	-	-	-	-
Total	41	100.0	0.66	41	100.0	0.58	41	100.0	0.81	41	100.0	0.76



Land-based or landless dairy farms? Preliminary insights from Greece

A. Ragkos^{*a}, A. Theodoridis^b and G. Koutouzidou^c

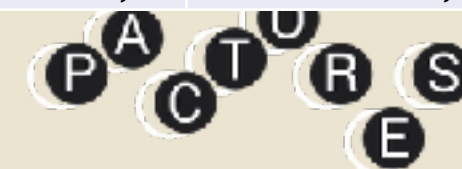
Seventh International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2019),
K. Themistocleous, G. Papadavid, S. Michaelides, V. Ambrosia, D. G. Hadjimitsis, Eds., Proc. of SPIE Vol. 11174,
111741H · © 2019 SPIE · CCC code: 0277-786X/19/\$21 · doi: 10.1117/12.2532487



Technical indicators	Average farm 'Purchasing'	Average farm 'Producing'	Average farm (Total)
Cultivated land (irrigated equivalent)	-	3,23	2,57
<i>Non-irrigated (ha/cow)</i>	-	0,09	0,07
<i>Irrigated (ha/cow)</i>	-	0,29	0,23
Cows	173	136,4	142,7
Milk production (ton/year)	1496	1065	1138
Milk yield (kg/cow/year)	8628,4	7804,8	7975,1
Average milk price (€/kg)	0,441*	0,436*	0,437
Labor requirements (hours/cow/year)	67,4**	100,8**	93,9
<i>Family (hours/cow/year)</i>	17,6**	55,5**	47,7
<i>Hired (hours/cow/year)</i>	49,8	45,3	46,2



Cost structure	Average farm 'Purchasing'		Average farm 'Producing'		Average farm (Total)	
	€/cow	%	€/cow	%	€/cow	%
Land	-	-	148,6	3,9	117,9	3,2
Own	-	-	39,2	1,0	31,1	0,8
Rented	-	-	109,4	2,9	86,8	2,4
Labor	235,9*	7,3	314,5*	8,3	298,3	8,1
Family	52,9**	1,6	166,5**	4,4	143,0	3,9
Hired	183,0*	5,6	148,0*	3,9	155,3	4,2
Capital	3003,4	92,7	3329,1	87,8	3261,5	88,7
<i>Variable</i>	2604,8	80,4	2478,6	65,4	2504,7	68,1
Crop production	0,0	0,0	383,0	10,1	303,8	8,3
Purchased feeds	2163,7**	66,8	1671,9**	44,1	1773,6	48,2
Other expenses	441,1	13,6	423,7	11,2	427,3	11,6
<i>Fixed</i>	398,6**	12,3	850,5**	22,4	756,8	20,6
Buildings	111,0*	3,4	360,8*	9,5	308,8	8,4
Machinery	87,0**	2,7	260,0**	6,9	224,2	6,1
Land reclamation	5,0	0,2	28,0	0,7	23,3	0,6
Livestock capital	195,6**	6,0	201,7**	5,3	200,5	5,5
TOTAL	3239,3**	100,0	3792,2**	100,0	3677,7	100,0



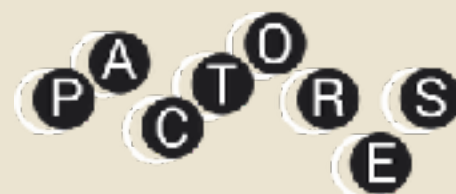
Financial results	Average farm 'Purchasing'	Average farm 'Producing'	Average farm (Total)
Gross revenue (€/cow)	4063,0	3727,2	3796,6
Production expenses (€/cow)	3239,3**	3792,2**	3677,7
Net profit/loss (€/cow)	823,7**	-65,0**	118,9
Returns to labor (€/hour)	15,7**	2,5**	4,4
Gross margin (€/cow)	1458,2	1248,6	1292,0
Farm income (€/cow)	1340,9	841,7	944,9
Milk production costs (€/kg)	0,351**	0,436**	0,437



Mountainous grasslands sustaining traditional livestock systems: The economic performance of sheep and goat transhumance in Greece

A. Ragkos^{1,*}, A. Siasiou², K. Galanopoulos² and V. Lagka¹

Options Méditerranéennes, A, no. 109, 2014 – Forage resources and ecosystem services provided by Mountain and Mediterranean grasslands and rangelands

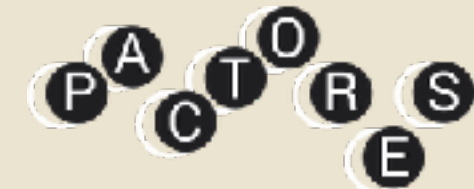


	Group 1	Group 2	Group 3	Mean farm
	(<350 ewes)	(351-600 ewes)	(>600 ewes)	
1. Number of farms (Sample)	40	46	35	121
2. Flock size (Ewes-Dams)	268	451	809	494
	(54.9)	(64.2)	(174.9)	(240.6)
3. Cultivated land (ha/ewe-dam)	0.015	0.019	0.026	0.020
	(0.043)	(0.042)	(0.039)	(0.041)
4. Milk yield (kg/ewe-dam/year)	108.1	97.5	90.3	96.0
	(44.5)	(46.9)	(37.8)	(43.8)
5. Labor requirements (h/ewe-dam)	21.6 ^a	14.5 ^b	9.8 ^c	13.5
	(7.5)	(3.6)	(3.0)	(7.1)
<i>Family (h/ewe-dam)</i>	16.5 ^a	10.2 ^b	7.0 ^c	9.8
	(7.9)	(4.1)	(2.8)	(6.8)
<i>Hired (h/ewe-dam)</i>	5.1 ^a	4.3 ^{ab}	2.8 ^b	3.7
	(5.0)	(3.9)	(2.4)	(4.0)



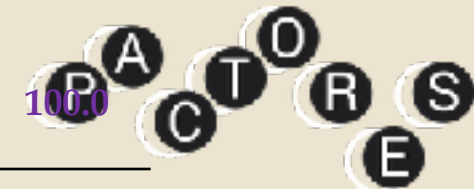
Economic performance of transhumant farms - Outputs

	Group 1 (<350 ewes)		Group 2 (351-600 ewes)		Group 3 (>600 ewes)		Average farm	
	€/ewe	%	€/ewe	%	€/ewe	%	€/ewe	%
Milk	98.9 ^a (48.1)	59.3	75.7 ^b (37.3)	53.3	75.0 ^b (36.7)	57.5	79.5 (42.0)	56.4
Cheese/Wool	2.7 ^a (7.0)	1.6	11.6 ^b (23.7)	8.2	5.1 ^{ab} (11.4)	3.9	6.9 (16.6)	4.9
Meat	45.0 (16.4)	26.7	39.5 (18.3)	27.8	38.4 (14.0)	29.4	40.0 (16.5)	28.3
Subsidies	20.4 ^a (4.8)	12.2	15.2 ^b (4.3)	10.7	12.0 ^c (4.3)	9.2	14.6 (5.5)	10.4
TOTAL	167.0 ^a (55.9)	100	141.9 ^{ab} (51.9)	100	130.5 ^b (43.1)	100	141.0 (52.4)	100



Economic performance of transhumant farms - Expenses

Expenses	Group 1 (<350 ewes)		Group 2 (351-600 ewes)		Group 3 (>600 ewes)		Average farm	
	€/ewe	%	€/ewe	%	€/ewe	%	€/ewe	%
1. Land rent	7.4 (7.9)	3.2	5.0 (7.6)	3.1	5.8 (5.3)	3.8	5.8 (7.1)	3.4
2. Labour	68.2 (24.1)	29.6	46.6 (12.3)	28.5	34.2 (11.3)	22.2	44.6 (22.2)	26.1
3. Capital	155.3 (63.9)	67.3	111.8 (45.7)	68.4	114.4 (54.2)	74.1	120.8 (57.8)	70.5
<i>3a. Variable capital</i>	130.3 (63.4)	56.5	91.3 (37.0)	55.8	93.5 (40.9)	60.6	99.4 (52.6)	58.1
Purchased feedstuff	89.9		63.4		67.8		70.2	
Animal production	33.9		25.3		22.7		25.6	
Crop production	6.5		2.6		3.0		3.5	
<i>3β. Fixed capital</i>	24.9 (10.9)	10.8	20.5 (14.6)	12.5	20.8 (18.3)	13.5	21.4 (14.7)	9.7
TOTAL	230.8 (73.6)	100.0	163.5 (51.5)	100.0	154.4 (57.8)	100.0	171.2 (57.8)	100.0






	Group 1 (<350 ewes)	Group 2 (351-600 ewes)	Group 3 (>600 ewes)	Average farm
	€/ewe	€/ewe	€/ewe	€/ewe
Gross revenue	146.6 (48.5)	126.8 (59.2)	118.5 (45.0)	126.4 (51.6)
Total expenses	230.8 ^a (73.6)	163.5 ^b (51.5)	154.4 ^c (57.8)	171.2 (57.8)
Net profit	-84.2 ^a (52.7)	-36.7 ^b (57.4)	-35.9 ^b (70.8)	-44.9 (60.4)
Rate of capital returns (%)	-11.1 ¹	-4.4 ¹	-3.7 ¹	-5.5 ¹
Farm income	-5.6 ^a (79.4)	20.3 ^{ab} (85.1)	29.1 ^b (55.9)	19.8 (49.3)
Gross margin	16.3 (37.7)	35.4 (50.4)	25.0 (55.9)	27.0 (48.5)





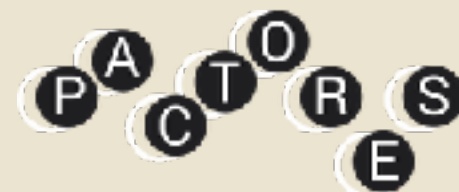
Article

Evaluation of the Contribution of Pastures on the Economic Sustainability of Small Ruminant Farms in a Typical Greek Area

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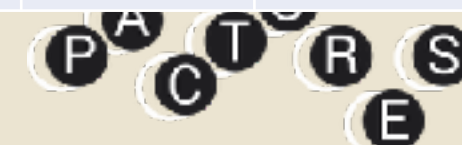


	Category 1 (1-1800h grazing)				Category 2 (>1800 h grazing)				
	Mixed farm (MF)	Sheep farm (SF)	Goat farm (GF)	Average farm (AF)	Mixed farm (MF)	Sheep farm (SF)	Goat farm (GF)	Average farm (AF)	TOTAL AVERAGE
Grazing (h/year)	1398	1005	1584	1189	2460	2332	2642	2478	1882
Spring (h/season)	408	318	414	355	645	607	729	662	520
Summer (h/season)	441	338	450	381	664	610	778	686	545
Autumn (h/season)	378	255	414	310	645	595	643	623	478
Winter (h/season)	171	94	306	143	506	520	492	506	339
Cultivated land (ha/ewe-dam)	0.05	0.03	0.05	0.04	0.02	0.07	0.01	0.03	0.03
Forage (kg/ewe-dam/day)	0.68	0.60	0.72	0.63	0.35	0.47	0.28	0.35	0.48
Concentrates	0.51	0.53	0.63	0.53	0.51	0.81	0.62	0.64	0.59
Labor (h/ewe-dam/year)	18.7	16.5	22.7	17.7	17.6	24.8	19.3	20.4	19.2
Hired (h/ewe-dam/year)	5.2	4.7	-	4.4	4.9	2.6	4.8	4.2	4.3
Family (h/ewe-dam/year)	13.5	11.8	22.7	13.3	12.7	22.2	14.5	16.2	14.9
Average size (ewes/dams)	302 (177/125)	310	205	294 (232/62)	385 (305/80)	200	350	294 (141/153)	294 (183/111)
Milk yield (lt/ewe-dam)	162.3 (155.8/171.6)	181.5	226.6	180.4 (176.2/196.4)	153.6 (158.0/136.4)	183.1	148.0	159.4 (173.0/146.9)	169.1 (177.9/199.5)
Meat yield (kg/ewe-dam)	10.1	11.4	9.1	10.9	9.7	10.4	9.6	9.8	10.3
Milk price (€/lt)	0.63 (0.76/0.48)	0.78	0.54	0.72	0.68 (0.72/0.52)	0.73	0.53	0.63	0.67



	Category 1 (1-1800h grazing)				Category 2 (>1800 h grazing)				AVERAGE FARM
Production expenses	Mixed farm (MF)	Sheep farm (SF)	Goat farm (GF)	Average farm (AF)	Mixed farm (MF)	Sheep farm (SF)	Goat farm (GF)	Average farm (AF)	
Land	8.16	4.78	6.92	5.92	2.87	13.57	2.31	5.65	5.78
<i>Rented</i>	5.20	3.04	6.13	3.93	2.01	8.28	1.89	3.74	3.83
<i>Own</i>	2.96	1.74	0.79	1.99	0.86	5.28	0.42	1.91	1.95
Labor	51.69	47.88	68.20	50.86	47.66	72.74	56.23	58.85	55.15
<i>Hired</i>	11.23	12.46	0.00	10.94	9.55	6.16	12.83	10.13	10.51
<i>Family</i>	40.46	35.42	68.20	39.92	38.11	66.58	43.40	48.72	44.65
Capital	154.11	170.61	188.52	167.72	144.90	202.21	119.69	149.36	157.86
<i>Variable</i>	97.45	108.55	117.53	106.32	94.41	130.85	82.35	99.11	102.45
Purchased feeds	69.00	86.34	86.96	81.58	79.89	99.80	63.43	77.81	79.55
Crop production	11.47	6.66	10.31	8.34	3.20	14.32	3.09	6.32	7.26
Other	16.97	15.56	20.26	16.40	11.31	16.73	15.83	14.98	15.64
<i>Fixed</i>	56.66	62.06	70.98	61.41	50.50	71.37	37.35	50.25	55.41
Total	213.96	223.28	263.64	224.51	195.43	288.52	178.24	213.87	218.79

€ per ewe/aam



	K1: 0 -1800 hours of grazing				K2: 1801 - 3600 hours of grazing				
Financial results (with subsidies)	Mixed	Sheep	Goat	Average	Mixed	Sheep	Goat	Average	TOTAL AVERAGE
Gross revenue (€/ewe-dam)	186.82	223.49	205.79	211.63	174.38	229.68	153.38	180.25	194.77
Production expenses (€/ewe-dam)	213.96	223.28	263.64	224.51	195.43	288.52	178.24	213.87	218.79
Net profit (€/ewe-dam)	-27.14	0.21	-57.84	-12.87	-21.05	-58.84	-24.86	-33.62	-24.02
Return to labor (€/h)	1.31	2.91	0.46	2.14	1.51	0.56	1.63	1.23	1.62
Capital return (%)	-0.03	0.04	-0.07	0.01	-0.02	-0.06	-0.04	-0.04	-0.02
Farm income (€/ewe-dam)	47.91	72.12	36.80	62.06	44.32	50.50	45.83	46.80	53.86
Gross margin (€/ewe-dam)	89.38	114.94	88.26	105.32	79.98	98.83	71.03	81.14	92.32
Production cost - Sheep milk	1.18	0.96		1.05	1.00	1.22		1.14	1.10
Production cost - Goat milk	0.74		0.91	0.68	0.72		0.83	0.82	0.75

