Oper Res Int J (2011) 11:77–92
DOI 10.1007/s12351-010-0078-y

ORIGINAL PAPER

Impact assessment of CAP policies on social sustainability in rural areas: an application in Northern Greece

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Received: 19 June 2009 / Revised: 14 February 2010 / Accepted: 16 March 2010 /
Published online: 30 March 2010

Abstract This study aims to assess the multiple impacts of the Common Agricultural Policies (CAP) on social sustainability in rural areas. Social sustainability is related to social capital, social inclusion, social exclusion and social cohesion in rural economies, terms that are described in this paper and measured by relevant social indicators. A multicriteria model was formulated in order to study the social impacts of the CAP reform ("decoupling") and Water Framework Directive. The model estimates the farmers' utility function taking in account various conflicting criteria that can explain the farmers' behavior (e.g. maximisation of farm income, risk minimisation, minimization of labour, etc.). The model is further used to simulate the impacts on social sustainability by estimating the social indicators mentioned above. The model is applied in a region of Northern Greece. There is a major reduction in family and external labour in the study region as a result of the implementation of EU policies. These effects cause many social problems particularly in the ageing of population because of the internal migration. There are also social problems for the seasonal workers of agricultural labour market who are mainly foreign immigrants. In addition, there are changes in the profile of gender issues since the decrease in women employment is much higher than in men. These changes have a negative effect on the social sustainability. The paper provides a future path for research taking suitable methodology and policy for social sustainability in rural areas.

Keywords Social sustainability · Multicriteria model · Tobacco · CAP · Decoupling · Water framework directive

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1 Introduction

A traditional argument connected to CAP is the issue of maintaining economically vital rural communities, particularly in disadvantaged regions where alternative income opportunities were limited. However, in the last decades, a full range of new issues has emerged. Ageing of population in rural areas, raise the issue of "greying" society in connection to liveliness of rural areas and residential use of farms. Intra and extra EU migration has led to important changes in agricultural labour market and in non-agricultural residential communities in rural areas. While particularly in southern Europe immigrant labour has brought a major contribution to economic survival of agriculture and created new opportunities for labour allocation outside farming for local families, it also has generated new social inclusion problems (Kasimis et al. 2003). The role of the household as the core of the independent farm tenants is changing with the increasing labour opportunities for the youth and this also changes the profile of gender issues in rural areas. Altogether, these strong changes ask for a revision of problems connected with the management of social capital and social inclusion. On the other, social capital, individual skills and knowledge is an increasing factor in productivity and competitiveness, particularly in an enlarged and liberalized economy.

Social sustainability in rural areas is affected by the implementation of the EU Policies (Viaggi et al. 2010). With the CAP reform the European Union introduced direct payments to EU farmers based solely on historical payments. Such payments, by being up to 100 percent decoupled from current production, allow farmers to make production decisions based more on market signals than on policy interventions (Kelch 2004). On the other hand, the EU Water Framework Directive (Directive 2000/60/EC, 2000) was enacted in the first half of 2000 and establishes a framework for Community action in the field of water policy. In the light of this Directive, EU Member States are obliged to put into practice a cost recovery strategy and to implement a water pricing policy. In practice, this means that farmers of most irrigation schemes will have to adjust their production practices or their cropping patterns to either higher water prices or to tighter water controls (Arriaza and Gomez-Limon 2006).

The objective of this paper is to assess the impact of the CAP reform (Single Farm Payment Scheme—decoupling) and WFD on social sustainability in rural areas. Specifically assesses the social sustainability by simulating alternative scenarios using a multicriteria mathematical programming (MCDM) model. To this end, we take in account specific indicators for the employment, social capital, social cohesion, social inclusion and demographic changes, and estimate the total labour use, the labour by gender and the employment structure at farm level. The above MCDM model is applied in a region of Northern Greece.

2 Social sustainability

Social sustainability is "one of the three legs of the sustainability stool" (the other two are environmental and economic). Each leg has not been equally prioritized

by policy makers within the sustainability discourse (Drakakis and Smith 1995; Thompson 2007). There is limited literature that focuses on social sustainability to the extent that a comprehensive study of this concept is still missing. As a result, there have been very few attempts to define social sustainability as an independent dimension of sustainable development. Each author or policy maker derives their own definition according to specific criteria, making a generalised definition difficult to achieve. Omann and Spangenberg (2002) contend that social sustainability focuses on the personal assets like education, skills, experience, consumption, income and employment and comprises every citizen's right to actively participate in his/her society as an essential element. In recent years, social sustainability has also become an important component of the mainstream political discourse of governments, which have attempted to identify the issues involved with this concept. A report by the European Panel on Sustainable Development (EPSD 2004) points out that the Lisbon European Council in 2000 launched for the first time the idea of a social dimension as an integral part of the sustainable development model. These attempts to identify the main elements of social sustainability highlight that a coherent and comprehensive theoretical framework to a fully integrated approach to sustainability is still lacking from the literature and it is unlikely that one could be developed in the near future. This is due to the multifaceted nature of the concept of sustainability that amalgamates social, environmental and economic matters into a new independent entity. However, it is accepted that social sustainability is related to social capital, social inclusion, social exclusion and social cohesion in rural economies. For this reason, it is necessary to analyze these terms, as well as to identify relevant indicators for measuring them.

2.1 Social capital

Social capital refers to bonds of trust and mutual concern that arise through volunteering, socializing, and taking part in organizations. Social capital is a concept based on the collective value of social networks. Research suggests that social capital pays off in myriad ways—promoting the transmission of new ideas, improving children's education, enhancing the efficiency of labor and capital markets. Putnam (2000) and others find that many activities that build social capital have been declining in the US for several decades. Social capital requires maintenance and replenishment by shared values and equal rights, and by community, religious and cultural interactions. Without such care it depreciates as surely as does physical capital. The creation and maintenance of social capital, as needed for social sustainability, is not yet adequately recognized (Putnam 2000). Further, Coleman (1998) contends that social capital is transitory because it consists of relations among persons and it may decrease if the affluence of a given community or official sources of support grows in times. In his views, networks and relationships are created and strengthened by adverse circumstances but public participation declines as key problems are resolved in deprived communities.

2.2 Social inclusion: social exclusion

The term social inclusion has a wide usage, particularly in the West. According to Atkinson (2000), the notion of social exclusion originated in the 1970s as a broad concept with a number of interpretations. In the UK the government has used their definition of social exclusion to define social inclusion as the opposite: '*Social inclusion is achieved when individuals or areas do not suffer from the negative effects of unemployment*, *poor skills*, *low income*, *poor housing*, *crime*, *bad health*, *family problems*, *limited access to services and rurality*, *e.g. remoteness*, *sparsity*, *isolation and high costs*' (Social Exclusion Unit 2004). From the UK government's definition of social exclusion five government objectives for achieving social inclusion have been derived. These are: improved educational achievement; increased employment prospects; improved health; reduced crime; improved physical environment.

At EU level, one of the EU agencies most closely involved in social inclusion is the Employment and Social Affairs Directorate, which administers the European Social Fund to promote social inclusion across the EU. The European Social Fund's definition of social inclusion is: '*The development of capacity and opportunity to play a full role*, *not only in economic terms*, *but also in social*, *psychological and political terms*' (European Union 2009).

2.3 Social cohesion

There are many different conceptual approaches to social cohesion. They vary according to period, culture and the prevailing political ideas and differ from one another mainly in terms of the role of the players involved, the areas of life or groups concerned and, finally, the methods they employ to foster this cohesion. This definition, is based on the four constituent dimensions of human well-being that are essential for the functioning of societies that recognise human rights and democracy as underpinning the way they are organised: fair and equal access, individual (and collective) dignity, the autonomy of the individual and participation in community life. In this context, social cohesion is not a "nostalgic" concept hankering after a "lost social harmony", but a highly topical one that encompasses key aspects of a political strategy for a modern society based on the recognition of rights: sustainability and freedom with fairness, co-existence with diversity, vigilant concern for human dignity, autonomy and the freedom of decision now and in the future both as an individual and as a community.

3 Indicators for social sustainability

A plethora of sustainability indicators have been developed (Commission of the European Communities 2005). Eurostat also uses many indicators in order to describe social sustainability by measuring social phenomena such as demographic changes, employment, social cohesion, social inclusion and social capital (Eurostat 2005). Data constraints loom large in a regional study, and 'subject to availability'

turns out to be a significant caveat. Many of the indicators we might like to track are simply not available (O'Connor 2005). We used the main social indicators defined by Eurostat in order to estimate the social sustainability. The list of the proposed social indicators shows the indicators which are in practice examined, reflecting the balance between the ideal and the constraints of data availability. These indicators are referred to employment, social cohesion, social inclusion and demographic changes and presented in Table 1 (European Commission 2003).

4 Methodology

When modelling the dynamics of agricultural systems, economists recognized that farm households vary and that this variation is important, but rather than attribute this variation to social factors, they concentrated on defining farm types by structural variables such as farm size and enterprise mix. The socio-economic element of these farm households has been assumed to be constant, and all farm decision-making units have been assumed to act as rational financial maximizers (Amir et al. 1991; Ghadim et al. 1991). In many ways, this is almost inevitable given that most agricultural modellers use Linear Programming to model the socio-economic dimension of agricultural systems. However, common sense suggests that not all farmers within any given farm type are similar, and it is becoming increasingly apparent that few individuals maximize financial gain.

Table 1 Proposed social indicators (Eurostat 2005)

Social indicators
Employment
Total employment
Employment by gender
Employment rate
Unemployment rate
Social cohesion
Long-term unemployment rate
Jobless households
Early school leavers
Social inclusion
Lifelong learning
Individuals' level of computer use
Individuals' level of internet skills
Demographic changes
Life expectancy at age 65, by gender
Net migration
Average exit age from the labor market, by gender

4.1 Multicriteria mathematical programming

The methodological tool will be used is scenario analysis based on multicriteria decision making in order to measure and compare the impacts of different CAP policies on basic social indicators (e.g. employment, labour use etc.) as well as to simulate the most realistic decision processes such as optimum farm resource allocations (land, labour, capital, etc.). In our study we used only social indicators concern mainly the quantification of the change in labour (Employment indicator in Table 1) in order to measure total employment, employment by gender and family versus external labour which are critical indicators for farmers.

Sumpsi et al. (1993, 1997) and Amador et al. (1998) have extended methodologies for the analysis and simulation of agricultural systems based upon multicriteria techniques. These authors propose weighted goal programming as a methodology for the analysis of decision making. This methodology has been successfully implemented on real agricultural systems (Bartolini et al. 2007a, b; Berbel and Rodriguez 1998; Gomez-Limon and Berbel 2000; Gomez-Limon et al. 2002; Gomez-Limon and Riesgo 2004; Manos et al. 2009a, b; Manos et al. 2006, 2007).

Specifically, an MCDM model was developed in order to achieve better policy-making procedures and simulate the most realistic decision process. The utility MCDM model was chosen because of the variety of criteria taken into account by farmers when they plan their crop plans, broadening in this way the traditional assumption of profit maximization. It also assembles the multifunctionality of agriculture involving variables related with economic, social and environmental aspects.

The utility MCDM approach in comparison with other approaches such as linear programming, cost benefit analysis, etc. can achieve optimum farm resource allocations (land, labour, capital, water, etc.) that imply the simultaneous optimization of several conflicting criteria (maximization of gross margin, the minimization of risk, the minimization of labour used, etc.).

We propose the following objectives, constraints and attributes in order to measure the CAP impacts on social sustainability (Table 2):

4.1.1 Objectives

Three objectives are proposed in order to express the farmer's decision-making process:

Profit maximisation: The objective function included in the model is defined as follows:

$$\text{Max GM} = \Sigma \text{GMi} \times \text{Xi}$$

where Xi is crop i, GM is the total Gross Margin and GMi is the gross margin of crop i.

Risk minimisation: In our model risk is measured as the variance of the total GM. The risk is computed as:

Table 2 Objectives, constraints and attributes of the proposed MCDM model

Objectives	Constraints	Attributes
Profit maximization	CAP-single farm payment	Total labour
Max GM = Σ GMi × Xi	CAP-production rights	Family labour
Risk minimization	CAP-quotas	External labour
Total Risk = $\overline{x_i'}[\mathrm{Cov}]\overline{x_i}$	CAP-crop rotations	Labour by gender
	Land total	Employment rate
	Land irrigated	Income
Labour minimization	Market constraints	
TL = Σ TLi × Xi	Capital	
	Variable costs	
	Total labour	

$$\text{Min Total Risk} = \overline{x_i'}[\mathrm{Cov}]\overline{x_i}$$

where [Cov] is the variance/covariance matrix of gross margins during a period of time and x_i is the crop decision vector.

Minimisation of labour: Labour is computed as the sum of labour for all farming activities (TL), and its objective function is as follows:

$$\text{Min TL} = \Sigma\ \text{TLi} \times \text{Xi}$$

4.1.2 Constraints

In order to analyze the CAP social impacts we use a set of constraints resulted from the implementation of the new CAP:

CAP production rights: The sum of production rights (PRi) for crops (Xi) according to CAP regulations should be minus-equal to the total production rights of the area (TPR):

$$\Sigma\text{PRi} \times \text{Xi} \leq \text{TPR}$$

CAP quotas: The sum of Quotas (QPi) for all crops (Xi) according to CAP regulations should be minus-equal to the total quotas of the area (TQP):

$$\Sigma\text{QPi} \times \text{Xi} \leq \text{TQP}$$

Land total: The sum of total available land for all crops (Xi) must add up to 100. This constraint is only introduced in order to obtain the outcome of the model (decision variables Xi) as percentages.

$$\Sigma\text{Li} \times \text{Xi} \leq 100$$

Land irrigated: The sum of total available land for irrigated crops (Xi) cannot exceed the total irrigated land of the area (TLI).

$$\Sigma\text{ILi} \times \text{Xi} \leq \text{TLI}$$

Market constraints: They were defined according to market limitations and on the basis of the maximum historical cultivation during the planning period.

$$\Sigma \mathrm{MCi} \times \mathrm{Xi} \leq \mathrm{TMC}$$

Available capital: Total variable capital needed for all crops (Xi) cannot exceed the total available capital (TVC). Variable costs are calculated as the sum of six categories of variable costs: Seeds, Fertilisers, Chemicals, Machinery, Labour, Irrigation water.

$$\Sigma \mathrm{VCi} \times \mathrm{Xi} \leq \mathrm{TVC}$$

Total labour: Total labour used for all farming activities (Xi) cannot exceed the total available labour (TLA).

$$\Sigma \mathrm{LAi} \times \mathrm{Xi} \leq \mathrm{TLA}$$

4.1.3 Attributes

Attributes are values of interest for the analysts that are deduced as functions of decision variables. In this paper, we have considered attributes that are relevant to policy makers and measure the impact of CAP in social dimension of rural areas. The MCDM model used has been developed in order to estimate the values of these attributes at the same time as the decision variables. Since agriculture is one of the main sources of employment any change in CAP will significantly affect the social structure in rural areas. We used as attributes some of the social indicators presented in Table 1 that can give sufficient estimations of the social sustainability in rural areas. These indicators are directly related to the structure of employment in farm and are directly affected by the implementation of the CAP. The indicators are: Total labour, Family labour, External labour, Labour by gender, Employment rate and Income.

4.2 Scenarios definition

We have chosen two scenarios to be implemented in the model. The first is the WFD Scenario and second is the Decoupling Scenario. These scenarios were chosen on the basis of the main EU policies affecting agricultural policy, farm structure and farmers' behaviour in rural areas. Specifically the chosen scenarios describe the two main policies of the European Union affecting farmers' decisions: The Water Framework Directive and the Single Farm Payment Scheme (Decoupling) of the CAP reform.

In Scenario 1 we study the impacts of the Water Framework Directive (WFD) implementation in agriculture, as irrigated agriculture is the main consumer of the water resources. The implementation of WFD could bring major changes for irrigated agriculture in European Union, particularly as a consequence of the principle of full cost recovery.

Scenario 2 is used as a reference to compare the impacts of the single farm payment (SFP) scheme. The SFP scheme allows payments to be up to 100 percent

decoupled from production depending on the crop cultivated and the country in which SFP scheme is implemented. Our study area is a tobacco cultivation area in Greece. For this reason we have chosen full decoupling (100%) because the single farm payment scheme for tobacco in Greece is completely decoupled.

5 Area of study and data

We have applied the methodology explained above in the region of Tobacco Cooperative of Toumba Kilkis. Toumba agricultural area is located in Kilkis Prefecture in the north part of Greece in Central Macedonia. The economy is based primarily on agriculture, the most important crops being tobacco, wheat and cotton, and to a lesser extent maize. Fields of alfalfa, barley, rye and sunflowers are also common. The utilized agricultural area (UAA) in Toumba covers an area of 1,589 ha.

Table 3 presents the distribution of utilized agricultural area. It is covered by arable crops especially hard wheat (29.0%), soft wheat (6.2%), cotton (29.8%), maize (2.5%) and tobacco (26.7%). As we can see tobacco has a major part in the existing crop plan.

The technical and economic coefficients of crops resulted from the agricultural indicators from the Regional Government of Central Macedonia, as well as from field work using questionnaires. The data are referred to the period 2001–2005 (5 years). Extra data were concentrated from publications of Ministry of Agriculture and the Department of Agricultural Economics of the Aristotle University of Thessaloniki.

Table 3 Distribution of utilized agricultural area in Toumba (Tobacco Cooperative of Toumba Kilkis)

TOUMBA		
Crops	Ha	%
Soft wheat	99.0	6.2
Hard wheat	461.0	29.0
Barley	8.0	0.5
Rye	7.0	0.4
Maize	40.0	2.5
Tobacco	425.0	26.7
Cotton	474.0	29.8
Sunflower	8.0	0.5
Alfalfa	10.0	0.6
SA	57.0	3.6
Total	1,589.0	100.0

Table 4 Pay off matrix for Toumba agricultural area

Values	MCDM			Real (observed values)
	GM	VAR	TL	
GM	156,792	114,982	125,282	148,197
VAR	156,915,037	82,875,235	102,630,327	139,112,028
TL	75,173	75,899	33,637	78,915

6 Results

We applied in our MCDM model the weighted goal programming technique for the three objectives (maximization of Total Gross Margin (GM), minimization of Variance of gross margin (VAR), minimization of Total Labour (TL)).

The pay-off matrix for the Toumba agricultural area is shown in Table 4.

From Table 4 we conclude that there is a certain degree of compatibility between the second and the third objective and that both conflict strongly with the first. On the other hand, the last column shows the real values in the study region. It gives the values of the three objectives for the actual crop distribution, in a 100 ha farm. In this way we can see how far the real situation is from any single MCDM values (column). This induces us to try a combination of the three objectives, as a better simulation of farmers' behavior.

The estimation of these weights was based on the current situation. In this sense it is important to note that the set of weights can be considered as a structural factor. As these weights correspond to the physiological attitudes of the producers it is reasonable to assume that they will kept at the same level in the short and the medium run, and this is actually an important pre-assumption in our simulation. In order to simulate our scenarios, we will use the above weights to represent the farmers' utility function. The utility function will be:

$$\mathrm{UF} = 76.0\%\ \mathrm{GM} - 24.0\%\ \mathrm{VAR}$$

The function shows that the farmers behave according to an additive utility function in which the most important criterion appears to be gross margin and second the risk. The labour as the third criterion does not appear to be important for farmers. Main reason for this is the tobacco cultivation in the area, which is a labour intensive cultivation.

This function that the model will attempt to maximize will be applied to the subsequent simulation. Table 5 shows the comparison between the real situation and the predicted situation with the help of multi-criteria model (MCDM), which has as objective function the maximization of utility function. Trying to combine the two objectives, profit maximization and total risk minimization, the MCDM model gives a farm plan that achieves gross margin 5.8% more than the existent farm plan.

On the contrary the optimum plan presents lower social indicators than the existent plan (Table 6). Specifically, we observe a decrease in total labour 4.7%, in family labour 2.8% and finally in external labour 5.9%. As regards the employment by gender, in the optimum crop plan we have a reduction for both male and female

Table 5 Comparison between observed values and MCDM model in Toumba area

	Observed values	MCDM model	
		Model values	Deviation (%)
GM	148,197	156,792	5.8
VAR	139,112,028	156,915,037	12.8
TL	78,915	75,173	−4.7
Soft Wheat	6.2	9.0	44.5
Hard Wheat	29.0	26.4	−9.1
Barley	0.5	1.0	98.6
Rye	0.4	0.0	−100.0
Maize	2.5	0.0	−100.0
Tobacco	26.7	25.0	−6.5
Cotton	29.8	35.0	17.3
Sunflower	0.5	0.0	−100.0
Alfalfa	0.6	0.0	−100.0
SA	3.6	3.6	1.4
Total	100.0	100.0	

Table 6 Social indicators—comparison between observed values and MCDM model

	Present	Optimum MCDM	Deviation (%)
Total labour (h)	78,914.7	75,173	−4.7
Family labour (h)	30,155.1	29,323	−2.8
External labour (h)	48,728.1	45,850	−5.9
Labour by gender (h)			
Male	45,148.2	42,923	−4.9
Female	33,766.5	32,250	−4.5
Employment rate	78.9%	75.2%	−4.7
Income (€)	148,197.3	156,792	5.8

labour 4.9 and 4.5%, respectively. A reduction in the employment rate is also observed (4.7%).

By applying in our MCDM model the two Scenarios we get the results in Table 7. This table shows the comparison between the present situation and the predicted situation with the help of the MCDM model, which has as objective function the maximization of utility function under the two alternative Scenarios.

Table 8 presents the social indicators and the comparison between the current situation and the optimum situation with the MCDM model, under the two alternative Scenarios. The MCDM model gives an optimum crop plan that income 5.8% more than the current crop plan. As regards the total labour, the MCDM model achieves an important reduction 4.7%.

Table 7 Production plan (ha) under the two alternative scenarios

Crops	Present	Optimum MCDM	Scenario 1 WFD	Scenario 2 Decoupling
Soft wheat	6.2	9.0	9.0	9.0
Hard wheat	29.0	26.4	30.9	29.8
Barley	0.5	1.0	1.0	1.0
Rye	0.4	0.0	0.0	0.0
Maize	2.5	0.0	5.9	12.8
Tobacco	26.7	25.0	10.6	0.0
Cotton	29.8	35.0	32.8	31.1
Sunflower	0.5	0.0	1.3	3.9
Alfalfa	0.6	0.0	2.2	5.0
SA	3.6	3.6	4.1	5.2
Pomegranates			1.2	1.2
Cherries			1.0	1.0
	100.0	100.0	100.0	100.0

Table 8 Social indicators under two alternative scenarios

	Present	Optimum	%	Scenario 1 WFD	%	Scenario 2 decoupling	%
Total labour (h)	78,914.7	75,172.7	−4.7	44,464.3	−43.7	19,428.8	−75.4
Family labour (h)	30,155.1	29,322.7	−2.8	21,250.3	−29.5	14,310.8	−52.5
Labour by gender (h)							
Male	34,449.7	32,922.7	−4.4	23,455.3	−31.9	14,950.8	−56.6
Female	44,465.1	42,250.0	−5.0	21,009.0	−52.8	4,478.0	−89.9
External labour (h)	48,728.1	45,850.0	−5.9	23,104.0	−52.6	4,868.0	−90.0
Employment rate	78.9%	75.2%	−4.7	44.5%	−43.7	19.4%	−75.4
Income (€)	148,197.3	156,791.9	5.8	145,687.9	−1.7	125,653.8	−15.2

In Scenario 1 (WFD) we have a decrease in farmer's income, as a result to an increase in variable cost, due to the price for water use. An important decrease is observed in total labour 43.7%, in family labour 29.5% and finally in external labour 52.6%. As regards the labour by gender, we have a major reduction in female labour 52.8% than in male labour 31.9%. This is because women mainly work in tobacco cultivation which is a labour intensive crop.

In the second scenario (Decoupling) we have important decreases both in farmers' income 15.2% and in total labour 75.4%. This decrease is due to the implementation of the single farm payment scheme, which affects the tobacco cultivation, one of the major crops in Toumba area. A decrease is also observed in family and external labour 52.5 and 90.0%, respectively. We observe a reduction in female labour 89.9% and in male labour 56.6%. The difference between genders is due to tobacco, which has an important role in the current crop plan, and requires

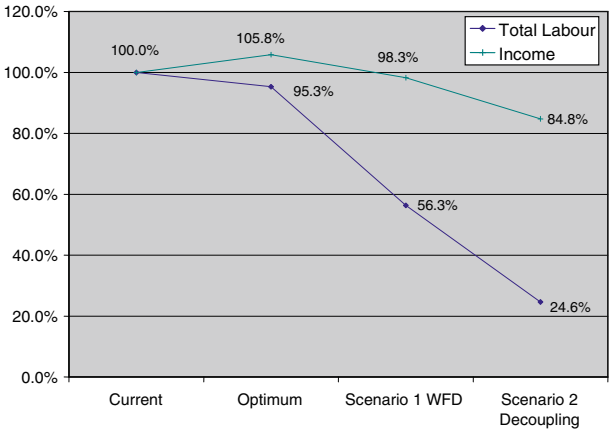

Fig. 1 Total labour and income in the optimum and under the two alternative scenarios crop plans

many working hours from the family and external (seasonal) workers. Following the decoupled payments of the CAP reform (decoupling 100%), farmers will abandon tobacco which will involve a drastic reduction in labour requirements. The implementation of decoupling in Toumba area affects primarily the tobacco cultivation. For this reason tobacco participation in the crop plans is reduced significantly. As a result we observe that the required external labor is reduced too.

A comparison of social indicators between the existent crop plan, the optimum plan and the plans of the two scenarios is presented in Figs. 1, 2 and 3.

As regards income we can see in Fig. 1 that values vary between 5.8% increase to 15.2% decrease, in comparison with the current situation. In Optimum Scenario there is an increase due to farmer's adoption of new profitable crops. On the other hand, WFD and Decoupling Scenario are negative scenarios with a high decrease both in farm income and in total labour.

Same trends are presented and in Gender Labour comparison in Fig. 2. In all Scenarios men labour use is higher than the women labour use and both are reduced in all scenarios. We can see that in Decoupling Scenario the women labour use is reduced by −89.9% than in the Current Scenario. Figure 3 presents the comparison between family and external labour. In all Scenarios the use of family labour is higher that the external labour. The labour use follows negative trends and has an extreme decrease in Decoupling Scenario especially for external labour use −90%. These changes are due to the abandonment of the tobacco cultivation, a labour extensive cultivation, from crop plans in both Scenarios.

7 Conclusions

This paper contributes to the study of the social impacts of CAP in the rural areas. The results of the implementation of multicriteria mathematical programming model for measuring the effects of the CAP show that EU policies have multiple social impacts in rural areas, and particularly in the farm employment structure.

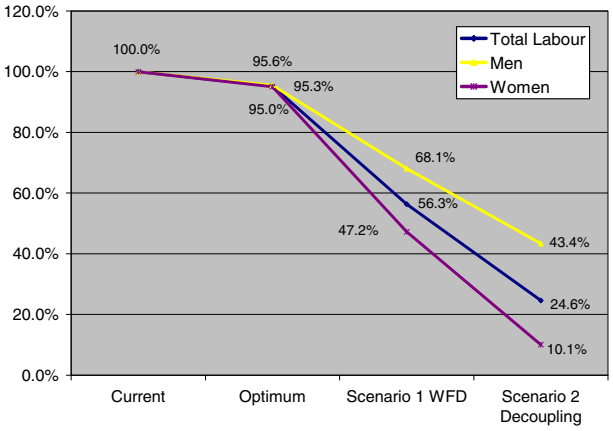

Fig. 2 Total labour and labour by gender in the optimum and under the two alternative scenarios crop plans

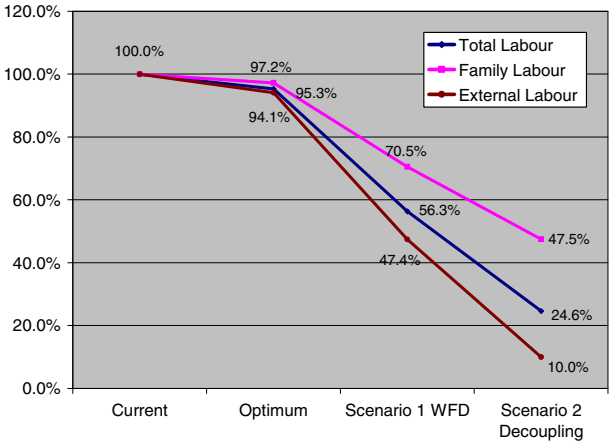

Fig. 3 Total, family and external labour in the optimum and under the two alternative scenarios crop plans

In rural areas, the relevance of agriculture is still significant in terms of employment opportunities. We observe that in total labour, in family labour, and especially in external labour, there is a major reduction as a result of the implementation of EU policies. These effects cause many social problems in the rural economies particularly in the ageing of population in rural areas because of the internal migration. There are also social problems for the seasonal workers of agricultural labour market who are mainly foreign immigrants. Linked to the agricultural activity there is a large employment of immigrants. Immigrant labour has brought a major contribution to economic survival of agriculture and created new opportunities for labour allocation outside farming for local families. But low incomes and high seasonality of work could represent important risk for the society

especially for the seasonal workers. In addition, there are changes in the profile of gender issues in rural areas. Gender issues are a typical aspect of labour division in agriculture, since the decrease in women employment is much higher than in men. Altogether these changes have a negative effect on the social sustainability in rural areas and ask for a revision of problems connected with the management of social capital, social cohesion and social inclusion.

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