

ORGANIZATIONAL INFORMATION

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Publisher  
Edizioni Dedalo s.r.l.  
on behalf of CIHEAM - IAM of Bari

Administration and Subscription Office  
Edizioni Dedalo s.r.l.  
v.le Luigi Jacobini, 5  
Zona Industriale - Bari 70123  
Casella Postale BA/19, Bari 70123  
Tel. 080/531.14.13 (pbx)  
Fax 080/531.14.14  
e-mail: info@edizionidedalo.it  
www.edizionidedalo.it

Subscription rate  
Italy: 45 Euro, Foreign: 90 Euro

Postal Current Account n. 11639705  
in the name of:  
Edizioni Dedalo s.r.l., Bari

Advertising/*Publicité*  
Edizioni Dedalo s.r.l., Bari

New MEDIT is indexed and abstracted in:  
CAB ABSTRACTS, AGRIS/FAO database, EconLit,  
ISI Web of Science

New MEDIT web page:  
www.iamb.it/resouce/public/newmedit

ISSN: 1594-5685

Registrazione  
Tribunale di Bari, n. 1546 del 4.1.2002

Direttore Responsabile  
Giulio Malorgio

Stampa  
Dedalo Litostampa s.r.l., Bari

NEW MEDIT è associato alla

Unione  
Stampa  
Periodica  
Italiana



# NEW MEDIT

## Vol. VIII - n. 3/2009

*Mediterranean Journal  
of Economics, Agriculture  
and Environment*

*Revue Méditerranéenne  
d'Economie, Agriculture  
et Environnement*

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# Climate change and water resources issues

ATEF HAMDY\*

The recent intergovernmental panel on climate change (IDCC, 2007), highlight clearly that water is the medium through which climate change acts out upon livelihood, economic and environment.

Indeed, climate change is felt first through water because of drought, floods, storms, melting ice and sea-level rise.

To date, much attention has been focussed on the dimensions of temperature and sea level rise. Substantial work has also been done on some of the consequences, such as change in rainfall and the risk of more and more intense floods and droughts.

However, not nearly enough work has been done to understand how to cope with the potential impact of climate change on the water environment at a regional, national and local level (5<sup>th</sup> WWForum, 2009).

What should be clearly kept in mind is that if the challenges of climate change for the world's water are not understood and addressed, we run the risk that water supplies we provide to the communities of a growing urbanizing world, the infrastructures we build to serve them and the industries and agriculture that supply and feed them, will prove to be unsustainable.

Adaptation efforts must begin immediately, unless we act now, we will miss opportunities to make it easier to ensure a more sustainable long term future. An approach to water resources management that can identify and address the challenge -and uncertainties- is needed.

Water being the primary link between the climate and the human system, it is, therefore, at the centre of adaptation. However, before discussing this issue, there are several key problem statements, those can be possibly expressed in the following questions, including:

## - *Governing arrangements*

Is water a high enough priority in adaptation policies and plans and what does that mean for governance and decisions-making?

Is adopting and implementing best practices in water management a step forward in coping with climate change?

## - *Planning for a daptation*

Are tools and information available to plan effectively for adoption?

How to better plan for adaptation?

What needs to be included and integrated across sectors?

## - *Local actions*

What are the pro's and con's of response options? And how can or will local climate adaptation be done in practice?

## - *Financing a daptation*

Is there a need for additional finance? What are the blockages to effective financing for adaptation? And what are the response options and how should be accomplished?

Finding a reasonable solutions to the abovementioned key problems is not an easy process, however, as far as, the concern is climate change adaptation in water management and services, experiences gained and learned lessons are giving more emphasis to several issues.

Water should be made a high priority in policy and planning for adaptation in order to reinforce and strengthen the resilience of water system and make responses to water crisis more effective. Equally, this will result in generating multiple benefits across sectors, hence, this implies looking outside the water box and across sectoral borders.

Efforts ought to strive towards «best practice» in operation and maintenance in combination with demand management for poorly operating water system. Indeed, this can be a big step towards adapting to climate change

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by making such water systems more adaptive and resilient.

A crucial issue for climate change adaptation is the local actions. Adaptation, vulnerability, mitigation and the multiscale and multidisciplinary challenges associated with climate change impacts can only be tackled by broadening the portfolio of response options on a local level.

That is a practical and realistic approach to be followed to help water resources managers and water service managers to adapt successfully to global and climate induced changes in the water resources.

Although the general shape of the future climate change is increasingly clear, there is still substantial uncertainty about the climate that will be experienced in different parts of the world. The broad picture of global warming is reasonably well understood and there is growing agreement about its regional dynamics and scale. Regarding the rainfall predictions, at present, they are relatively general and are indicative rather than definitive (IPCC Report Summary, 2007). Being difficult to make good predictions about the future of rainfall storms, it is undoubtedly true that to predict the impact of changing temperature and rainfall on water availability is to be more difficult. That is why moving from temperature prediction to reliable predictions of local rainfall, its distribution and the resultant river flow is a huge step forward.

The water related extremes are increasing and are likely to be more frequent and higher in magnitude under the changing climate. Nowadays these extremes are posing a great challenge to the human society in terms of looming food crises, pressure on natural resources, loss of livelihoods and in loss of life.

Disaster risk reduction should be factored into policies, planning and programming related to sustainable development, relief rehabilitation and recovery activities and, above all, should be fully understood under the changing climate. In areas where climate change is felt, it is vital to have not only a reliable projections of various climate change scenarios but, also, the way these scenarios would impact the hydrological cycle.

There are multiple challenges confronting many countries around the world to mitigate successfully to climate induced changes in their water resources. However, addressing such challenges requires addressing not only the scientific and engineering aspects but, al-

so, the social, environmental, economic and legal and institutional aspects. Aware of that, the integrated approach being multi-sectorial and multi-disciplinary provides a suitable framework for water related risk management under IWRM through policies and strategies where a combination of hard infrastructural and soft institutional measures are in practice.

Indeed, both measures are involved in the IWRM, beside the fact that it addresses a set of soft tools that are often cheaper and, in some cases, could be more effective than its infrastructural tools. Such tools provided by the IWRM are offering many countries a better chance of coping successfully with climate variability and change. However, this requires that various stakeholders and players to play their part according to their experiences starting from planning to implementation. Equally, for successful adoption and implementation, most countries are in need to an appropriate knowledge base on water resources and climate change, institutional mechanisms and management systems to coordinate responses and support difficult decisions, funding the actions required and most of all with a close cooperation and collaboration at global, regional and national levels.

To conclude, at present many countries are already promoting and implementing IWRM, according to the decision already taken at the 2002 World Summit on Sustainable Development concerning that all countries should establish integrated water resources management plan by the year 2005. The presence of this framework should be used to address the challenges of climate change in a structured way. For this to be realized complementary assistance is needed not just to support climate change adaptation, but to ensure that water resources managers, particularly in poor countries, are equipped and helped to use the new tools and more efficient technologies to manage their water resources under the climate change risks to compensate for the lack of resources that might tempt them to rely on more traditional, hardware solutions.

The observations and research findings demonstrate that the IWRM systematic approach with its variable tools has already proved to be useful for climate change adaptation. Therefore, to ensure the water management sustainability much more work is needed that helps to mainstream adaptation into national development plans.

### ▪ Mediterranean Rural Territories

Omar Bessaoud  
Michel Petit

Jel classification: Q180, O180

#### *Summary*

Despite the radical differences – related to different demographic, economic and social dynamics- between the north and the south of the Mediterranean region as regards the evolution of rural areas, in recent years a strong convergence has paradoxically appeared concerning the need for a territorial approach to rural development policies in the whole region. There is extensive literature, reviewed briefly in this article, on the scientific grounds legitimising this territorial approach. Recent experiences, both in the North and in the South, show that local community organisations have a key role to play in the effective promotion of rural development for the benefit of the poorest and weakest. However, many obstacles need to be overcome for that role to be effective, both in the North and in the South. Possible failures would greatly jeopardise the current and desirable future efforts that should be undertaken to face the difficult conditions of the poorest populations in the Southern and Eastern countries of the region.

**Keywords:** rural development, territorial policy, Mediterranean countries

#### *Résumé*

Malgré de profondes différences entre le nord et le sud de la région méditerranéenne quant à l'évolution des zones rurales- différences liées d'abord à des dynamiques démographiques, économiques et sociales contrastées, il est paradoxal qu'une forte convergence se soit dégagée au cours des années récentes sur la nécessité d'une approche territoriale des politiques de développement rural dans toute la région. Un ensemble important de travaux scientifiques, brièvement évoqués dans cet article, légitime cette approche territoriale. Les expériences récentes, au Nord et au Sud, montrent que les organisations communautaires au niveau local ont un rôle clé à jouer dans la promotion d'un développement rural au bénéfice des plus pauvres et des plus faibles. Mais de nombreux obstacles doivent être surmontés, tant au Nord qu'au Sud, pour que ce rôle potentiel puisse être effectif. Ne pas le faire mettrait en péril les efforts actuels ou à venir pour améliorer la situation des plus pauvres dans les pays du Sud et de l'Est de la région.

**Mots clés:** développement rural, politique territoriale, Pays Méditerranéens

## ▪ Spot market versus Incentive Contract

Marta Fernández-Olmos  
Luz María Marín Vinuesa

Jel classification: L140, C150

### **Abstract**

This paper attempts to develop a consistent theory for the choice of performance contracts in agriculture by analyzing the trade-off between quantity and quality and the presence of competence and uncertainty on the basis of the expected utility theory. This theory is able to explain many contract-related issues, such as why the performance contract can be optimal even providing lesser quantity and quality than the spot market and why a trade-off between processors' and consumer' interests about mechanism choice can exist, utilizing a simulation exercise.

**Keywords:** Spot market, incentive contract, moral hazard

### **Résumé**

Cet article essaie de mettre au point une théorie cohérente pour le choix de contrats basés sur la performance dans le secteur agricole, en analysant le compromis entre quantité et qualité, la présence de compétence et d'éléments d'incertitude et ce, sur la base de la théorie de l'utilité attendue. Cette théorie est à même d'expliquer bon nombre de questions associées aux différentes formes de contrat : elle révèle par exemple la raison pour laquelle le contrat de performance s'avère optimal tout en donnant origine à quantité et qualité inférieures au marché au comptant, et fraye la voie à l'existence d'un possible compromis entre intérêts des transformateurs et intérêts des consommateurs sur le mécanisme à choisir grâce à un exercice de simulation.

**Mots clés:** marché au comptant, contrat à clause d'intéressement, aléa moral

▪ **Practices in Milk Collection Centres for Quality Milk Production: A Case from the Aegean Region of Turkey**

**Nevin Demirbaş  
Duygu Tosun  
Figen Çukur  
Evren Gölge**

Jel classification: Q120, Q130

***Abstract***

In Turkey, the most important problem for food safety is the supply of good-quality, safe raw material to the dairy industry. Milk collection centres (MCC) play an important role between the dairy farms and the dairy industry. In order to supply the high-quality, safe and adequate raw milk required by dairy processing firms, MCCs in the Turkish milk supply chain act as a bridge between the dairy farms and dairy processing industry. The aim of this paper is to demonstrate the role of MCCs in supplying good-quality, safe milk to the Turkish dairy sector. According to the results of this study, some problems appear evident because the milk is produced on small dairy farms. MCCs are also of small and medium size, therefore raw milk analyses cannot be fully achieved for the absence of qualified personnel and for equipment inadequacies. Subsidies and incentives must be made available in order to ensure the acquisition of technical equipment to be used in the analyses to determine the quality of the milk supplied to MCCs. Both the MCC personnel and the farmers must be educated on food safety and hygiene issues.

**Keywords:** Dairy Sector, Food Quality, Milk Collection Centres, Milk Farming, Turkey

***Résumé***

En Turquie, le problème le plus important de la sécurité alimentaire c'est l'approvisionnement en matière première salubre et de bonne qualité pour l'industrie laitière. Les centres de collecte de lait jouent un rôle de liaison entre les exploitations et les industries du secteur laitier. Dans la filière turque d'approvisionnement en lait, ces centres servent en pont entre les exploitations laitières et les industries de transformation afin de fournir une quantité adéquate de lait cru de haute qualité et salubre. L'objectif de cet article est de décrire la fonction de ces centres de collecte en Turquie. D'après les résultats obtenus, il y a des problèmes évidents dérivant du fait que le lait est produit par des exploitations de petite taille. Même les centres de collecte de lait sont de petite et moyenne taille ; par conséquent, les analyses sur le lait cru ne peuvent être bien exécutées suite à l'absence de personnel qualifié et à l'insuffisance d'équipement. Il est d'importance fondamentale de fournir des subventions et de prendre des mesures d'incitation pour assurer l'achat d'équipement de laboratoire pour déterminer la qualité du lait délivré aux centres de collecte. Aussi bien le personnel des centres de collecte que les exploitants doivent être formés aux questions de sécurité et hygiène alimentaire.

**Mots-clés:** Secteur Laitier, Qualité Alimentaire, Centres de Collecte du Lait, Production Laitière, Turquie.

## ■ Problématique de financement de l'investissement agricole en Tunisie

Mustapha JOUILI

Jel classification: H810, Q180

### **Résumé**

A partir du milieu des années 1980, la politique de financement de l'agriculture tunisienne a fait l'objet d'une série de réformes. L'objectif étant une mobilisation accrue du système bancaire et l'accroissement du nombre d'exploitants éligibles au crédit institutionnel. La réalisation de cet objectif est recherchée à travers le désengagement de l'Etat et l'instauration de frontières entre crédit et assistance. Cependant, au lieu d'assister à un renforcement du rôle du système bancaire dans le financement des investissements agricoles privés, c'est plutôt un affaiblissement marqué de ce rôle qui est enregistré. En dépit des incitations consenties, les exploitants agricoles demeurent faiblement intégrés dans le système de financement institutionnel. Le crédit bancaire a plutôt tendance à se concentrer sur les grands exploitants qui offrent les garanties nécessaires, alors que les petits exploitants sont de plus en plus exclus de tout système régulier de financement de leur activité.

**Mots-clés** : agriculture, politique de financement, crédit agricole, Tunisie

### **Abstract**

In Tunisia, since the mid-1980s, the funding policy for agriculture has undergone a series of reforms, aimed at mobilizing the banking system and increasing the number of farmers eligible for institutional credit. To achieve this objective it is necessary to support the disengagement of the State and a clear-cut separation between credit and assistance. However, the banking system has not become stronger in funding private investment in agriculture and this has resulted in a significant weakening of its role. Despite the incentives given, farmers are poorly integrated in the institutional funding system. The bank credit tends rather to focus on large farms that provide the necessary guarantees, whereas small farmers are increasingly excluded from any regular funding system to support their activity.

**Keywords:** Agriculture, funding policy, agricultural credit, Tunisia.

▪ **The adoption of technical and organizational innovations and their impacts on the dairy sheep breeding in Tunisia**

**Aziza Mohamed  
Raoudha Khaldi  
Gley Khaldi**

Jel classification : Q120, Q160

**Abstract**

In Tunisia, the size of the dairy Sicilo-Sarde sheep population has decreased by 90%. Its productivity has stagnated at around 70 litres/ewe/lactation over the last decade. The milk production is totally used for cheese making. The objective of this work is to identify the innovations adoption and their impacts on flock performance. Two types of innovations are considered: technical innovations (food supplementation, early weaning and crossing with Sardinian breed) and organizational innovations (membership in breeders' associations). The adopted methodology is based on an exhaustive survey. Two milk production levels were selected for the analysis: a "class 1" (production level > 70 litres/ewe/lactation) and a "class 2" (production level ≤70liters/ewe/lactation). The results show that, whatever the milk production level, the innovation adoption rates of food supplementation and early weaning are still low, but they remain higher in class 1. The same conclusion is true for the organizational innovation which seems to slightly improve the flock performance. The farmers membership to the breeders' association allowed an increase in the milk price and reduced the monopoly imposed on the sector.

**Key words:** Tunisia, dairy sheep, technical innovation, organizational innovation.

**Résumé**

En Tunisie, l'effectif des ovins laitiers de race Sicilo-Sarde a chuté de 90%. La productivité de cette race a stagné autour de 70 litres/brebis/lactation au cours de la dernière décennie. Le lait produit est totalement utilisé pour la fabrication du fromage. L'objectif de ce travail est d'identifier l'adoption des innovations et leur impact sur les performances des troupeaux. Deux types d'innovation sont pris en considération: innovation technique (complémentations alimentaires, sevrage précoce et croisement avec la race sarde) et innovation organisationnelle (adhésion à des associations d'éleveurs). La méthodologie adoptée se base sur une enquête exhaustive. Deux classes de niveaux de production enregistrés ont été retenues pour l'analyse : > 70 litres/brebis/lactation et ≤ 70 litres/brebis/lactation. Les résultats montrent des taux d'adoption encore faibles de la complémentation alimentaire et du sevrage précoce et ce, quelque soit le niveau de production, mais ils restent en tout cas plus élevés pour la classe 1. Il en est de même pour l'innovation organisationnelle qui semble améliorer légèrement les performances des troupeaux. L'adhésion de ces éleveurs à une association a permis d'augmenter les prix du lait et de réduire le monopole imposé sur le secteur.

**Mots clés:** Tunisie, ovins laitiers, innovation technique, innovation organisationnelle.

▪ **The Relationship Between Agricultural Insurance And Environmental Externalities From Agricultural Input Use  
A Literature Review And Methodological Approach**

**Fabian Capitanio  
Felice Adinolfi**

Jel classification: D810, Q180, Q510

**Abstract**

The biological nature of agricultural production processes induce a higher degree of uncertainty surrounding the economic performance of farm enterprises. This has contributed to the development and acceptance of forms of public intervention aimed at reducing income variability that have no parallel in other sectors of the economy. In particular, subsidized crop insurance is a widely used tool. The impact of these programs on the decisions of production generates effects on input use, land use and thus, indirectly, environmental outcomes. The importance of this issue has grown in parallel with the growth in importance of the collective role of agriculture sector that has addressed the recent guidelines adopted by many developed countries. In this paper we performed an overview of literature on the field of environmental externalities of risk management policies in agriculture. Moreover, we tried to emphasize how risk management tools adoption could offset environmental programs which represent a pillar of the reformed CAP. In this context, an overview about Mathematical programming and risk in the farm model to address the effect of crop insurance and environmental payment on the farmers production behaviour has been implemented.

**Key words:** uncertainty, risk management, crop insurance, input use decisions, environmental externalities, mathematical programming.

**Résumé**

La nature biologique des processus de production agricole induit un niveau important d'incertitude concernant la performance économique des exploitations agricoles. Ceci a contribué au développement de formes d'interventions publiques afin de réduire la variabilité des revenus qui n'a pas d'égaux dans les autres secteurs économiques. Un outil très commun est représenté par l'assurance agricole subventionnée. Les impacts de ces programmes sur les décisions de production engendrent des effets sur l'utilisation des intrants, du sol, tout comme des répercussions indirectes sur l'environnement. L'importance de cette problématique s'est accrue parallèlement au rôle collectif de plus en plus important de l'agriculture qui a acquis les lignes directrices adoptées par les pays développés. Sur la base de la littérature, cet article offre un aperçu sur les externalités environnementales des politiques de gestion du risque en agriculture. De plus, on a essayé de souligner comment l'adoption des outils de gestion du risque pourrait bouleverser les programmes environnementaux qui sont un pilier de la nouvelle PAC. Dans ce contexte, on offre une analyse de la programmation mathématique et du risque au niveau de l'exploitation pour évaluer l'effet de l'assurance agricole et du paiement environnemental sur le comportement des agriculteurs.

**Mots clés:** incertitude, gestion du risque, assurance agricole, décision de l'utilisation des intrants, externalités environnementales, programmation mathématique

# Economic losses related to raw milk quality on commercial dairy farms in Kosovo

**Arben Musliu  
Muje Gjonbalaj  
Kurtesh Sherifi  
Maksim Meqe**

Jel classification: Q120, Q130

## **Summary**

The main goal of this research is to study the impact of somatic cell counts (SCC) on the profitability of commercial dairy farms in Kosovo based on the existing raw milk quality standards in order to determine the economic losses caused by high somatic cell counts in the raw milk produced by Kosovo dairy farms. The research results come from individual raw milk samples that were taken from June to September 2007 on 50 farms in the Dukagjini region and in the Kosovo plain. These samples were collected from 656 lactating cows out of a total of 816 cows under investigation. The strategy of the study is based in the collection and analysis of data concerning the following parameters: SCC, herd size, raw milk yield, raw milk protein and application of proper milking procedures. Based on the existing administrative instruction for raw milk quality standards for the year 2007, research found that the overall annual financial losses calculated on the 50 dairy farms under investigation reached an amount of €42,263 per year, whilst the average annual financial loss per farm was €845. Sixty-four percent (64%) of the 50 dairy farms produced milk that fell in Class III of the Administrative Order and received a price being 20% lower than the Class I price, resulting in an average annual loss of 2,772 euros/farm.

**Key words:** Quality standards, milk industry, farm management, Kosovo

## **Résumé**

L'objectif de cette recherche est d'étudier l'impact du comptage des cellules somatiques sur la rentabilité des exploitations laitières commerciales du Kosovo sur la base des normes de qualité du lait cru et ce, afin de déterminer de quelle entité sont les pertes économiques provoquées par un comptage élevé. Les résultats de la recherche dérivent de l'analyse d'échantillons individuels de lait cru prélevés dans 50 exploitations de la région de Dukagjini et de la plaine du Kosovo entre Juin et Septembre 2007. Ces échantillons ont été collectés à partir de 656 vaches laitières sur un total de 816 vaches investiguées. La stratégie d'étude se base sur la récolte et analyse de données concernant les paramètres qui suivent : comptage des cellules somatiques, taille du troupeau, rendement du lait cru, teneur en protéines du lait cru, et application de procédures adéquates de traite. Sur la base de l'instruction administrative concernant les normes de qualité du lait cru pour l'an 2007, nous avons mis en évidence qu'en général les 50 exploitations investigués ont vécu une perte financières annuelle s'élevant autour de €42263 par an, avec une perte moyenne de €845 par an, par exploitation. 64% des 50 exploitations laitières produisaient un lait de Classe III en recevant un prix de l'ordre de 20% inférieur au prix de la Classe I, avec une perte annuelle de 2772 euros/exploitation.

**Mots clés:** Normes de qualité, industrie laitière, gestion d'exploitation, Kosovo.

## ▪ Empirical Demand Analysis of Long-Length Roundwood (Sawlogs) in Greece

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Garyfallos Arabatzis**

Jel classification : Q230, Q210

### **Abstract**

In Greece and internationally, the roundwood is one of the most important forest products as it is widely used in the building and construction sector. In this study, the determination of the long-length roundwood (>2m) wholesale price is depicted in the form of an inverse demand system. The empirical application based on five species of long-length roundwood using annual auctions data provided reasonable and promising results. The quantity flexibilities suggest that prices responses to quantity changes are inelastic, whereas the Allais coefficients suggest substitutability between the different species of roundwood of long length.

**Key words:** demand analysis, flexibilities, long-length roundwood, wood sector, Greece.

### **Résumé**

En Grèce et dans le monde entier, le bois rond, qui est largement utilisé dans le secteur de la construction et du bâtiment, est l'un des produits forestiers les plus importants. Dans cette étude, le processus de détermination du prix de gros des longs rondins (>2m) est décrit sous forme de système à la demande inverse. L'application empirique basée sur cinq espèces de longs rondins, et utilisant les données annuelles des ventes aux enchères, fournit des résultats satisfaisants et prometteurs. Les flexibilités des quantités semblent indiquer que les prix ne s'ajustent pas en fonction de ces changements, tandis que les coefficients d'Allais obtenus semblent indiquer que les différentes espèces longs rondins sont interchangeables.

**Mots clés :** analyse de la demande, flexibilités, longs rondins, industrie du bois, Grèce.