SEVENTH FRAMEWORK PROGRAMME

THEME 6: Environment (including Climate Change)

Adaptive strategies to Mitigate the Impacts of Climate Change on European Freshwater Ecosystems

Collaborative Project (large-scale integrating project)
Grant Agreement 244121
Duration: February 1st, 2010 – January 31st, 2014

Deliverable 6.6
Workshop proceedings on collaborative scoping of solutions, Louros catchment, Greece

Lead contractor: **UPatras**
Other contractors involved: **N/A**

Due date of deliverable: **Month 30**
Actual submission date: **Month 27**

Work package: 6

Contributors: Dimitris Skuras, Alexandra Kontolaimou and Demetris Psaltopoulos

Estimated person months: 3

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013) Dissemination Level (add X to PU, PP. RE or CO)		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Abstract

The EU FP7 project REFRESH is developing a framework that will enable water managers to design cost-effective restoration programmes for freshwater ecosystems that account for the expected future impacts of climate change and land-use change. Task 3 of Work-Package 6 is concerned with scoping possible adaptation and mitigation measures to improve water quality, through collaboration with local stakeholders. In this context, a series of workshops were organized within six case study catchments in Greece, Czech Republic, Norway, Finland and the UK (one in England, one in Scotland), to specify and discuss such measures. This report summarizes the findings of a workshop held on the 23rd of November 2011 in the Louros municipality in Greece.

Participants at the workshop were invited following the guidelines devised by SYKE (Varjopuro et al., 2011) and comprised farmers, representatives from Local Organizations for Land Reclamation and representatives of the Amvrakikos (Natura 2000) Management Body. All these participants were identified as key actors with vested interests in the quality of freswhater in the Louros catchment and the ability to influence environmental conditions in this area.

Following on from the water environment problems identified in WP6 Tasks 1(profiling the case study catchments) and 2 (selection of sub-catchments to represent compliance challenges), measures discussed referred to changes in agricultural practices and mainly focussed on the reduction in the use of N/P fertilizers, setting aside irrigated land, crop rotation and introducing buffer zones. Participants indicated farm sectors which were mainly "responsible" for non-compliance and provided valuable information relating to the application of fertilizers and irrigation, including the timing of these two operations per crop. Also, relationships between N/P applications and crop yields and the impacts of alternative crop rotations on fertilization were discussed in detail. Ultimately, five combined measures were identified for cotton, maize and clover and two options were specified for citrus plantations.

With regard to climate change, concerns were focused on lower water level, decreased water supplies and sudden and extreme runoff during summer prior to sowing maize and cotton. Farmers showed a clear understanding of the economic and financial consequences of climate change. However, the implications of alternative climate change scenarios for the Louros proved difficult to grasp for the majority of the Louros stakeholders.

Overall, the workshop confirmed the importance of stakeholder involvement in the specification of measures to improve environmental conditions in Louros. Information on local agricultural practices provided by local stakeholders tended to be more reliable than that from regional or national sources and was thus utilized in the workshop discussions. This facilitated the choice of effective mitigation measures which can also be feasibly applied in this local context. Hence, patricularly where the institutional framework is rather weak and in a region current vulnerable to structural adjustment, it seems that the active involvement of stakeholders could positively contribute to better targeting of environmental policy interventions.

Introduction

The Refresh research project basically aims at developing a framework that will enable water managers to design cost-effective restoration programmes for freshwater ecosystems, accounting for climate and land-use changes in the context of Water Framework Directive (WFD) and Habitat Directive (HD). High significance is attributed to the engagement of local stakeholders in serving the main objectives of the Project. Task 3 of work-package 6 requires stakeholder involvement in scoping out the possible mitigating, adaptive and restoration options in order to identify the principal potential remediating strategies to deliver compliance with WFD and HD obligations for each catchment under study.

To this end, stakeholder workshops were organized for the six demonstration catchments of Dee and Thames Rivers in the UK, Louros River in Greece, Lake Pyhäjärvi/River Yläneenjoki in Finland, Vansjø-Hobøl in Norway and Orlik Reservoir in Czech Republic. The present report summarizes the findings of the workshop organised by the University of Patras that was held on the 23rd of November 2011 in the Louros municipality in Greece. The main purpose of the workshop was to discuss with major local stakeholders alternative mitigation measures in terms of their scope, feasibility and effectiveness in order to identify potential remediating schemes for the Louros sub-catchments to deliver compliance with WFD and HD under alternative climate change scenarios.

This report on the Louros stakeholder workshop is laid out as follows. Sections 2 and 3 identify the main pressures and stakeholders relevant to the Louros catchment. Information and details on the preparation preceding the workshop are provided in section 4. Section 5 describes the workshop procedure and activities presenting the programme, the discussion of the mitigation measures and the outcomes. The concluding section summarizes the results of the workshop as well as the lessons learned and relevant policy implications.

1 Identification of Pressures

The Louros located in the region of Epirus in Northwestern Greece (Fig 1), is a river of great significance at local, national and international level due to its multiple uses and environmental value. The river contributes with its delta and estuaries to one of the most important Natura 2000 sites, namely “Amvrakikos Gulf, Louros and Arachthos Delta”, while the wider wetland area forms ecosystems with particularly high ecological value. Farming (agricultural and livestock production) is the main land use around the Louros catchment, whilst there is also some limited manufacturing activity. In addition, common uses of the River’s waters include fisheries and fish farming units, hydroelectric power/energy production as well as water abstraction for municipal purposes.

Although there is a lack of systematic environmental monitoring of the quality and quantity of the River's surface and sub-surface water, fragmented scientific work shows that the state of the Louros River has been affected in both qualitative and quantitative terms. Chemical analyses undertaken in four monitoring points indicate high conductivity and high concentrations of pollutants mostly at the river's estuaries and the Petra Bridge. Relevant studies indicate agricultural and livestock activity, and population settlements as the principal sources of pollution (Skuras and Kontolaimou, 2010).

However, the exercised pressures are not of the same nature and intensity across the three sub-catchments that compose the Louros catchment (see Fig. 2). Sub-catchment A, which comprises the uplands, is largely pollution free because of the very sparse resident population and very limited economic activity. The riparian zone and the physical and morphological characteristics of the river in sub-catchment A are also of a good status. Nevertheless, historically accumulated signs of significant erosion in the watershed are evident (Skuras, 2010; Skuras et al., 2011).

Water quality in the Arta plain sub-catchment (sub-catchment B) is moderate due to nutrient loads caused by mainly agricultural and livestock activity, and inappropriate waste management. Waste from hog and poultry farming constitutes the major source of point pollution in this sub-catchment. Abstraction rates by agricultural activity are very high, while abstraction rates for municipal use are growing. Water quality in the Preveza plain sub-catchment (sub-catchment C) is also moderate due to intense agricultural activity and extensive irrigation and drainage works. In the estuaries of the Louros River in this sub-catchment pollution from nutrients and high conductivity are present. Abstraction rates for municipal use grow at a very significant rate while many small villages and medium sized town do not treat their municipal wastes. Overall, pollution of both nitrogen and phosphorus are identified as the main pressures for the Arta plain sub-catchment, while nitrification is the major problem for the Preveza plain sub-catchment.

The improvement of the water environment of the Louros catchment requires the up-taking of actions and the implementation of proper measures according to existing legislation. Environmental regulations and laws at the national level entail actions of compulsory character for the Louros water environment. The most significant of these regulations refer to the application of WFD, HD and cross-compliance as part of the 2003 reform of the Common Agricultural Policy (CAP). However, due to considerable delay in the application of critical articles of the WFD, the Louros catchment lacks of a managing authority and a management plan, while the monitoring system of surface and subsurface waters is incomplete (Skuras and Kontolaimou, 2010; Kontolaimou et al., 2011). As regards the implementation of the Habitats Directive focusing on the NATURA 2000 network considerable progress has been made at national level. So far, though, the Integrated Management Plan of Amvrakikos has not yet been granted official acceptance, due to considerable local opposition and reaction.

In parallel, the CAP comprises of a great variety of cross-compliance rules and agri-environmental measures referring among others to Good Agricultural and Environmental Condition, and Statutory Management Requirements. Other significant measures that could directly or indirectly affect water resources have been introduced in the context of the Rural Development Plan (RDP) for Greece 2007-2013. The plains of Arta and Preveza have been identified as vulnerable zones towards nitrogen pollution from agricultural run-offs, thus farmers are eligible for subsidization under this scheme in the Arta-Preveza plains. However, the implementation procedures of the relevant action plan exhibit considerable delay due to mainly financial resources constraints.

With respect to specific projects focusing on the wider area, it must be also noted that the Prefectural Administration of Preveza is implementing (since early 2009) a Master Plan on the Water Catchments of Louros, Acherontas and Amvrakikos Gulf. Also, the Prefectural Administration of Arta started a project concerning with the Creation of a Monitoring System and Assessment of Environmental Situation of Louros, Arachthos and Amvrakikos Gulf. Monitoring activities were carried out in the framework of LIFE-Nature and LIFE-Environment projects.

Despite the aforementioned regulations, plans and schemes aimed at improving and protecting the Louros water environment, one could argue that the outcome largely deviates from the expected or desirable one. The Louros stakeholder workshop organized for WP1 purposes in December 2010 (Kontolaimou et al., 2011) pointed to failures in administrative and management structures as being largely responsible for fragmented and partial implementation, or even non-implementation of mitigation measures. Limitations and weaknesses of institutional nature result in considerable deficiencies in monitoring and auditing mechanisms making compliance with existing policies insufficient or infeasible.

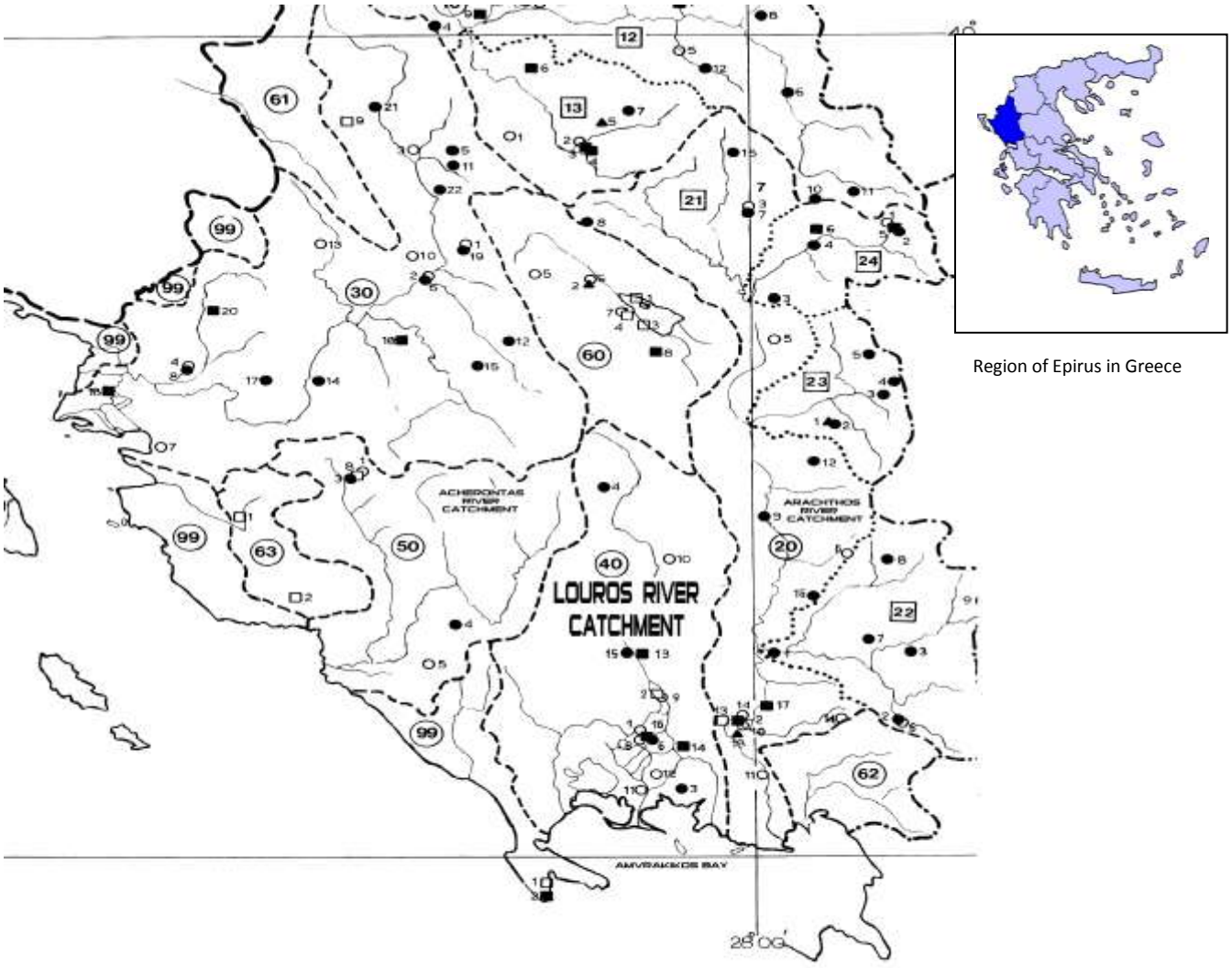

Figure 1. Location of the Louros River catchment in the Region of Epirus in Greece.

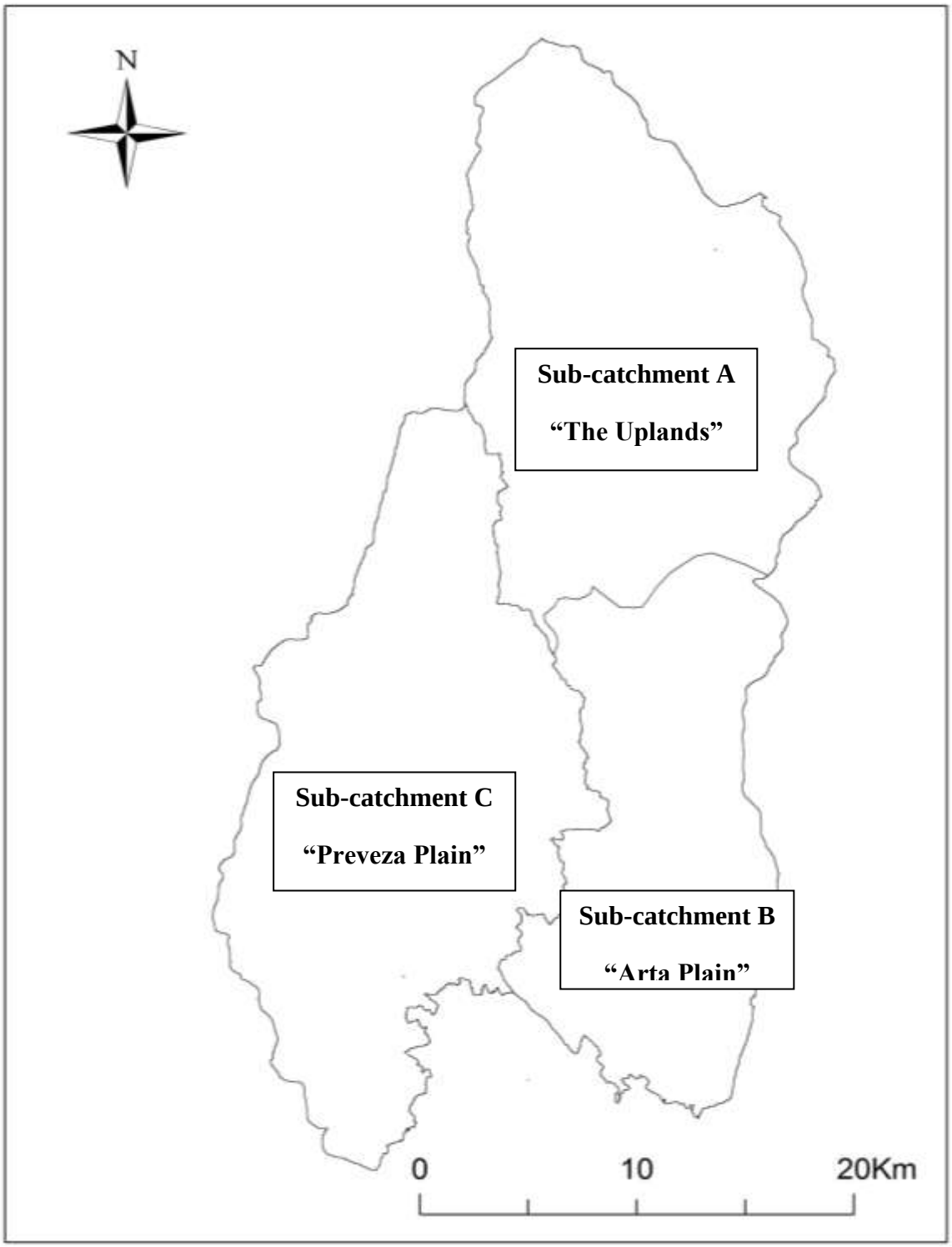

Figure 2. The three sub-catchments of the Louros catchment.

2 Stakeholder Identification

The above discussion draws attention to nitrification problems in the sub-catchments of the Arta and Preveza plains, and phosphorus pollution being particularly relevant to the sub-catchment of the Arta plain. Thus, the identification of stakeholders to be engaged in the discussion about potential mitigation/adaptation measures should focus on water quality issues and major drivers in the Louros sub-catchments related mainly to agriculture and livestock activities.

For the purposes of the scoping the solutions workshop, it was agreed (Varjopuro et al., 2011) that the stakeholders being involved should be individuals, groups or organizations who (a) can make a change in the area affecting positively or negatively the water status, (b) can initiate actions in the area, or (c) are influenced by a change of state of the aquatic environment or by the mitigation/adaptation measures, i.e. those who win and those who lose. It must be noted, however, that these categories are not mutually exclusive, in the sense that a single stakeholder may belong to two or all three of the above mentioned categories.

To proceed with the stakeholder identification procedure, a classification was proposed (Varjopuro et al., 2011) based on the degree of the stakeholders' power and interest (Table 1) with respect to the specific problem(s). Table 1 presents the relevant classification for the two sub- catchments of interest in the case of the Louros River. It must be noted, however, that major stakeholders for the Louros case had been already identified for the purposes of the stakeholder workshop in the context of WP1 (Kontolaimou et al., 2011). The rationale used for identifying stakeholders for the WP1 workshop is generally in the same line with the one proposed for the specific objectives of task 3 of WP6. Thus, in a way, the two Louros workshops seem to complement each other.

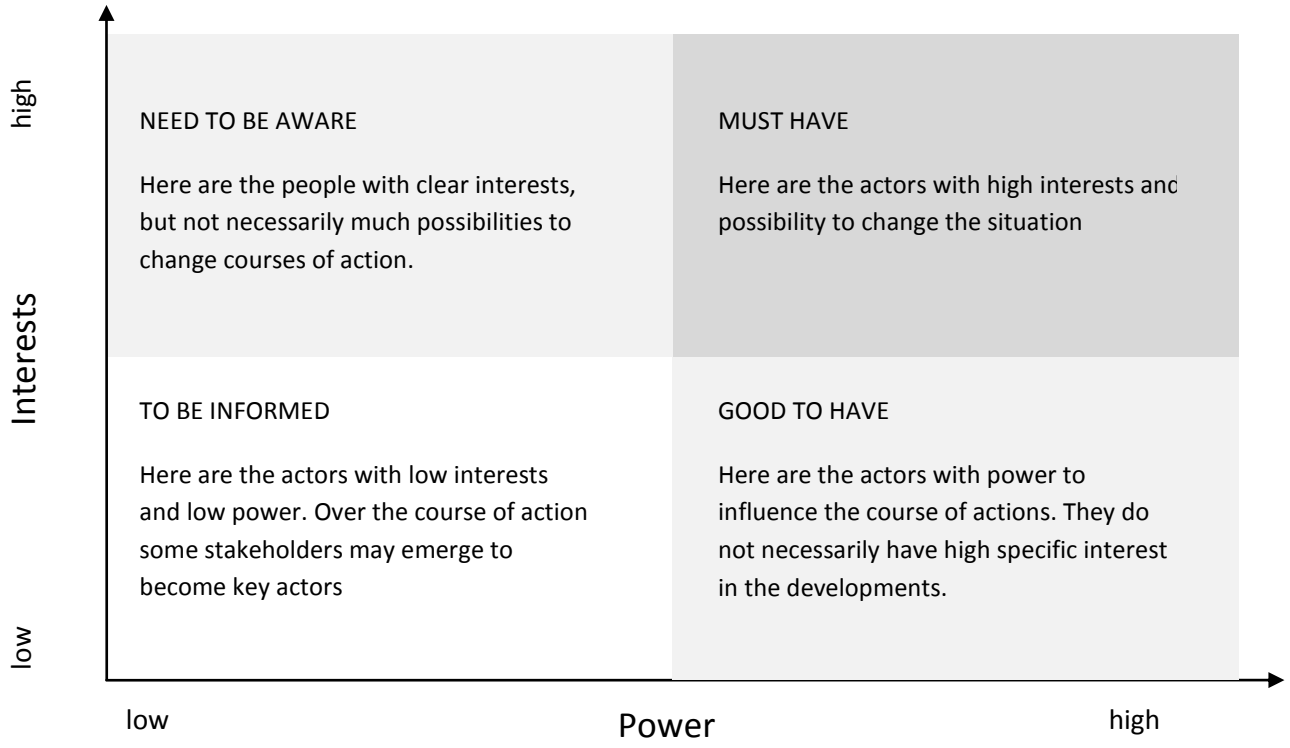

Figure 1. Stakeholder classification with respect to the degree of power and interest (Varjopuro et al., 2011).

	Lower power	Higher power
Higher interest	Fishery Cooperatives Fish farmers Public Power Corporation S.A (DEH AE) Manufacturing units	Farmers Local Organizations for Land Reclamation (TOEBs) Livestock cooperatives Amvrakikos Management Body
Lower interest		Municipalities

Table 1. Stakeholder classification in the sub-catchments of Preveza and Arta plains with respect to the degree of power and interest

Given the specific non-compliance issues at hand for the Louros sub-catchments, farmers were identified as the key actors to be invited to participate in the workshop. Significant is also the role of the Local Organizations for Land Reclamation (TOEBs) of Preveza and Arta which are formed by farmers and have the responsibility for maintaining and extending all land reclamation projects in

their area including irrigation, drainage and roading. Thus, a deputy of the TOEB of Preveza and representatives of Arta TOEB were also invited to participate in the workshop. Finally, two representatives of the Amvrakikos Management Body -the public non-profit organization being responsible for the administration and management of the nature and landscape of the Amvrakikos Gulf- was invited to attend the workshop.

All the invited stakeholders attended the workshop, that is a total of eight individuals. Since most of the participants had a farming background sharing common or similar interests, no particulars conflicts or tensions were apparent. Also, the fact that all participants shared the same views on the sources of non-compliance in Louros facilitated a "consensus" environment.

3 Preparation before the Workshop

As mentioned before, farmers were identified as the key stakeholder on the grounds that high levels of nitrogen and/or phosphorus observed in the specific sub-catchments were mainly due to excess use of fertilizers. Point pollution problems caused by hog and poultry farming which both contribute to phosphorus enrichment of the Arta plain were not discussed at the meeting, due to the fact that this problem is attributed to the inactive sludge treatment units which are installed in these farms, and thus, to the hardly efficient existing monitoring and inspection mechanisms at place (see also, Kontolaimou at al., 2011).

Subsequently, the discussion focussed on agricultural practices. A set of water protection measures was selected in advance to be used as a starting point for the discussion with the farmers. The choice of the particular measures was based on the agri-environmental programme designed for the plains of Arta and Preveza (Common Ministerial Decision 50981/2308) that have been characterised as Nitrate Vulnerable Zones. The proposed measures refer to changes in agricultural practices focusing mainly on:

- Reductions in the use of N/P fertilizers
- Setting aside irrigated land
- Crop rotation
- Uncultivated strips or belts (buffer zones)

The above general measures were collaboratively discussed with the farmers in terms of their scope, feasibility and effectiveness for specific cultivations in the Louros sub-catchments. Measures were specifically discussed in relevance to cultivations such as cotton, maize, citrus and clover. In contrast to our initial perception and plan, wheat was not included in those discussions, due to the fact that stakeholders argued that it is a rain-fed crop in this area of Greece. The ultimate goal was to end up with specific mitigation schemes, that is combinations of measures that would potentially achieve

compliance with WFD requirements under the base-line conditions and alternative climate change scenarios.

4 Description of Workshop

The workshop took place at the Town Hall of the Louros Municipality on the 23rd of November 2011. The meeting was facilitated by Dimitris Skuras (DS) and Dimitris Psaltopoulos (DP) from the Department of Economics of the University of Patras. The following sections summarise the workshop activities, discussions and outcomes.

4.1 Outline of the workshop programme

The workshop was scheduled as follows:

13:00 Arrival

13:10 Welcome of the participants and introduction of the workshop by DS

13:15 Presentation on the scope and background of the REFRESH project, the major issues in the Louros catchment and proposed actions/measures by DP

13:40 Presentation on the climate change scenarios for the Louros catchment by DS

14:05 Discussion of measures in the context of the existing action plan for the Arta-Preveza plains

14:50 Coffee break

15:00 Discussion of specific mitigation schemes for the Louros sub-catchments

15:45 Summary of the outcomes

16:00 Closing of the workshop

4.2 Discussion about each problem/pressure

All the participants were largely aware of the major issues and pollution sources in the aquatic environment of the Louros catchment. They agreed that nutrient enrichment is caused to a large extent by agricultural practices applied in the sub-catchments of Arta and Preveza plains. Recognizing the excess use of fertilization as a critical source of nitrification, farmers participating in the workshop discussed and provided specific information on the usual application of basic and surface fertilization and the associated yields for the major cultivations in the Louros sub-catchments.

A first discussion concerned with the cultivations contributing most to nitrate and phosphate pollution. A first approach showed that four arable cultivations, i.e., maize, wheat, cotton, and medic

(alfalfa) comprise more than 95% of all arable land in both sub-catchments. Furthermore, two perennial crops, i.e., citrus tree plantations and olive groves, comprise again more than 90% of all tree plantations in the two sub-catchments, the rest cultivated by kiwi fruit plantations and other fruit trees. It was unanimously agreed that wheat cultivation in the Arta-Preveza plain is not fertilized and is not irrigated and is a rain-fed crop. All participants also argued that the proportion of olive trees under intense cultivation including slight fertilization and irrigation is very restricted in this area of Greece. Thus, it was agreed that the focus of our discussion should be on the cultivations of maize, cotton, medic and citrus tree plantations.

With respect to future problems due to climate change, concerns were widely expressed about lower water level, decreased water supplies and sudden and extreme runoffs during summer time and before sowing the maize and cotton production (as in Kontolaimou et al., 2011). Farmers showed a clear understanding of the economic and financial consequences of climate change. For example, they were able to connect lower aquifer levels with increased energy costs for irrigation and the risk to increased water salinization at least in certain areas close to the wetlands. Extreme events lower yields with profound impacts on incomes while unforeseen or unusual rains during summer demand extra plant protection activities which increase the production cost. However, the implications of alternative climate change scenarios for the Louros sub-catchments proved a difficult issue to grasp for the majority of the Louros stakeholders. This was due to the fact that, for certain crops and certain scenarios, the yield is forecasted to increase while for other crops but under the same scenario, the yield is forecasted to decrease. For example, under the A1B scenario, the yield of cotton is expected to increase while the yield of maize is expected to decrease. To this end, scenarios and story lines specified for the Louros catchment area (Skuras, 2011) drawing from the relevant Bank of Greece study were presented and discussed. In general, stakeholders approved the scenario-specific elements and agreed with their contents and projections.

4.3 Discussion about proposed mitigation measures

The first part of the discussion focused on existing environmental legislation and policy measures, and more particularly on the action programme intended to deal with the nitrification problem in the Arta-Preveza plains. All stakeholders, in general, approve the existing plan expressing, though, criticism on specific aspects and measures. Their most significant objective concerned the absence of mitigation measures specific to citrus cultivation which constitutes a major source of the nitrogen and phosphorous pollution, especially in the Arta plain sub-catchment. On the other hand, as we explained above, mitigation measures concerning wheat were considered unnecessary, since such cultivation does not need fertilization and is rain-fed in this part of the country.

Subsequently, the Patras research team presented crop-specific “usual” fertilizer application in the area (drawing from the nitrification programme), while stakeholders (especially farmers) indicated real application, which differs somewhat and is sometimes lower and sometimes higher than

"usual". Then, the timing of fertilization (input to WP5) was discussed and the research team tried to obtain information on average applications, as fertilizers applied are different in terms of their N and P content, according to soil requirements. The, water requirements and the timing of irrigation (inputs to WP5) were discussed; it was found that timing was compatible with agronomic requirements and that many farmers have decreased irrigation to avoid paying fees to TOEBs or reduce energy costs for irrigation. From the discussion it was evident that P fertilization is connected to N fertilization as farmers try to apply both fertilizers in one application and avoid doubling the cost of fertilizer application. Thus, any attempt to reduce N fertilization will also reduce P fertilization.

Then, the discussion centered on the investigation of two issues:

- First, relationships between N/P and yields specific to all mitigation levels were investigated (for use in the CEA). Indicatively, questions asked were in the line of "if you reduce fertilizer application in citrus by 25%, how this would affect yields?".
- Then, the effect of alternative mitigation measures associated with crop rotation was investigated. This also involved two issues; first, if alternative crop rotations lead to the need for less fertilization next year (e.g. nitrogen-trapping legumes) and second, impacts on N fertilization (for next year) specific to alternative rotations; indicatively, if a farmer rotates with winter vetch, then there is no need to apply fertilizer to next year's cotton, while next year's maize needs only 50% of usually applied fertilizer.

Subsequently, alternative measures as well as combinations of measures for cotton, maize, citrus and clover were discussed in terms of their feasibility and effectiveness with respect to reductions in nitrogen and phosphorous loads in the Louros sub-catchments. Some measures such as setting aside of 35% of irrigated land were characterized as extreme and were unanimously rejected. Other proposed measures were faced with considerable caution. For example, they seriously doubted on the effectiveness of crop rotation with nitrogen trapping legumes that result in no need of fertilization during the next cultivation year. Also, as citrus cannot be associated with rotation, alternatives such as buffer strips and the reduction of N fertilizers were discussed. For example, an alternative measure for citrus tree plantations would be to manage the understory with either nitrogen trapping legumes or by applying minimum tillage. Farmers argued that in this part of Greece such a measure would be impossible because the majority of citrus plantations are irrigated by systems of drip irrigation that are also used as anti-frost devices during winter. Thus, the channel of irrigation pipelines is permanent on the ground and no plough would be possible. Furthermore, one farmer argued that even without a permanent irrigation pipeline system in place, he would not risk plough citrus trees as they form a very shallow root system very close to top soil's surface.

For all mitigation measures, information was obtained on their nitrogen loading effect (per ha) and cross-checked with relevant agronomic studies estimates. The discussion of combinations of measures led to the specification of alternative mitigation schemes specific to maize, cotton, citrus and clover. These measures are:

Mitigation measures discussed and approved for cotton, maize and clover

- Set aside 25% of irrigated land, reduce N fertilizers (including manure) by 25% to the rest of the 75% of irrigated land
- Crop rotation with non-irrigated nitrogen-trapping legumes on 20% of irrigated area; no fertilization to the 20% of land that was rotated with nitrogen-trapping legumes during the previous year for cotton and half of the fertilization for maize; leave 5% of land (strips or belts) uncultivated; reduce N fertilizer (including manure) by 25% to the rest of the 55% of irrigated land
- Set aside 30% of irrigated land, reduce N fertilizers (including manure) by 30% to the rest of the 70% of irrigated land
- Crop rotation with non-irrigated nitrogen-trapping legumes on 25% of irrigated area, no fertilization to the 25% of land that was rotated with nitrogen-trapping legumes during the previous year for cotton and half of the fertilization for maize, leave 5% of land (strips or belts) uncultivated, reduce N fertilizer (including manure) by 30% to the rest of the 45% of irrigated land.

Mitigation measures discussed and approved for citrus

- Reduce N fertilizers (including manure) by 25% to the whole of the plantation.
- Reduce N fertilizers (including manure) by 30% to the whole of the plantation.

5 Discussion and Conclusions

Stakeholder feedback on the REFRESH Stakeholder Engagement Process

Most of stakeholders participating in this consultation workshop also participated in the "Barriers to Implementation" Workshop organized in Louros in December 2010, in the context of WP1 of REFRESH (see Deliverable 1.15; Kontolaimou et al., 2011). In a way, the two Louros workshops seem to complement each other.

The WP1 workshop was based on a conceptual model devised by Waylen et al. (2011) and specifying a series of factors which can influence whether mitigation measures are implemented or not, including markets and business characteristics, financial constraints, time and labour needed to implement the measure, skills and experience needed, social networks, bureaucracy, and personal interests. As noted in Kontolaimou et al. (2011), stakeholders engaged in activities affecting the Louros catchment are aware of and have an opinion on what actions could help and what practices could harm the local water environment. However, in their attempts to change practices and adopt pro-environmental behaviour they face considerable obstacles and constraints, such as shortages in labour and human capital and more significantly, financial capital which seem to be playing a decisive role in the (non-)uptake of environmental actions. Low market prices for specific products which "squeeze" farmers and inadequate or poorly designed incentive schemes also act as a deterrent in changing behaviour and practices. Most importantly, limitations and weaknesses of institutional nature result in considerable deficiencies in monitoring and auditing mechanisms making compliance with existing policies insufficient or infeasible.

The above findings were confirmed in the WP6 workshop; a consensus was achieved amongst stakeholders on specific mitigation measures which could facilitate the improvement of the aquatic environment in Louros. In fact, WP6 workshop participants provided valuable information on actual (real) agronomic practices in the area, including their timing, and informed the research team on relationships between fertilizer applications and yields as well as on the impacts of alternative rotations on fertilization. At the same time, Louros stakeholders indicated shortcomings of state-planned action which has been designed towards this end (i.e. the nitrification agri-environmental action plan which targets problems caused by wheat cultivation and neglects citrus plantations and their effects on the water environment), emphasized current deficiencies of the monitoring and control systems (i.e. hog farms) and again, emphasized the importance of financial incentives. Also, in the context of the WP6 workshop, stakeholders once again underlined the existence of institutional and jurisdictional fragmentation which has led to ineffective and poorly targeted policy options in an area facing structural adjustment.

Also, participants of the WP1 workshop expressed their concerns on decreasing water availability in the Louros catchment due to climate change, while in the context of the WP6 meeting, stakeholders approved scenario-specific projections (Skuras, 2011) regarding land use in the Louros area.

To summarize, stakeholders expressed their satisfaction on their engagement in this process and on the opportunity which they had to co-construct (together with the research team) specific measures which would improve water quality in Louros. Also stakeholder had a positive perception on the coherence between the two workshops and expressed their desire to be informed in the future about the findings of the project and more specifically, WP6.

Lessons learned

Participants welcomed the "open discussion" environment of the workshop and argued that it enabled them to openly express their opinion. Also, they thought that the research team had a good grasp of the problems associated with the Louros water-environment and were well prepared for such a discussion.

Interaction among participants facilitated the specification of mitigation measures. In this context, taking into account the rather low level of social trust in an area facing structural adjustment, it seems that the decision not to break participants into separate groups was justified.

In a less positive manner, although workshop evaluation forms were distributed to participants in both Louros workshops (i.e. WP1 and WP6), only one reply was received so far.

Policy Recommendations

The importance of stakeholder involvement in the specification of mitigation measures which could improve environmental conditions in Louros was perhaps the most important policy message associated with this workshop. As already noted, stakeholders provided information on local agricultural practices which to some extent, contradict measures included in agri-environmental action plan designed by the Ministry of Rural Development and Food. Further, information on important aspects such as the timing of fertilization and irrigation is area-specific and cannot be dealt with by an average, national perspective. In other words, factual accuracy which characterized information provided by stakeholders facilitates the effectiveness of mitigation measures specific to this particular water environment. Further, measures discussed and approved by stakeholders are also characterized by their implementation feasibility, as they do not seem to trigger a significant environmental protection – farm incomes trade off. Hence, especially in a context characterized by its rather weak institutional environment, the active involvement of stakeholders could positively contribute to better targeting of policy interventions.

References

Common Ministerial Decision 50981/2308 (Official Journal B 1895/29.12.2006.). Programme for action for the valley of Arta-Preveza that has been defined a Nitrate Vulnerable Zone according to article 2 of Common Ministerial Decision 196522/1906/1999 (Official Journal 1575/β'), as this was amended and completed by article 2 (para B-5) of Common Ministerial Decision 20419/2522/2001 (Official Journal B' 1212).

Nikolaou, E. (2001). Study of the Aquifers of Epirus, Volume II. Institute of Geology and Mineral Extraction, Preveza.

Kontolaimou, A., Skuras, D. and Psaltopoulos, D., (2011). Report from Workshop in Greece to Explore Discrepancies between different Groups of Stakeholders regarding their Perceptions of the Policy Implementation Issues and the Underlying Factors that explain these Differences. REFRESH research project, Deliverable 1.15, Department of Economics, University of Patras.

Skuras, D. (2010). Impact Matrix for Louros (GR) Catchment. REFRESH research project, Work-package 6, Task 1. University of Patras, Department of Economics.

Skuras, D. (2011). Scenarios and Storylines for the Louros (GR) Catchment. REFRESH research project, Work-package 6, Task 3. University of Patras, Department of Economics.

Skuras, D. and Kontolaimou, A. (2010). The Profile of Louros (GR) Catchment. REFRESH research project, Work-package 1, Task 1. Department of Economics, University of Patras.

Skuras, D. , Kontolaimou, A. and Psaltopoulos, D. (2011). Report on Sub-catchment Rationale and Selection (GR), Work-package 6, Task 2. Department of Economics, University of Patras.

Varjopuro, R., Políčková, B., Psaltapoulos, D., Skarbøvik, E. and Slee, B. (2011). Participatory assessment of adaptation strategies in REFRESH WP6. Refresh working paper, August 11, 2011.

Waylen, K., Dunglinson, J., Blackstock, K., Skuras, D. and Psaltopoulos, D. (2011). Conceptual Model of Stakeholder Views of Measures and Potential Barriers to Uptake to Use in WP6. Refresh Deliverable 1.16. JHI and University of Patras.