



DESIRE WB-3 Stakeholder Workshop 1 report

WP3.1 Stakeholder Workshop 1 report - held in East Nestos Delta Basin, Greece, December 19, 2007.

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Stakeholder workshop 1

Land degradation and desertification – existing and potential prevention and conservation strategies

Results and conclusions from the stakeholder workshop

Name of the study site: **East Nestos Delta Basin, Greece**

Date of workshop: **19 December 2007**

Author(s): **Dr. Ir. V. Diamantis, Dr. Ir. A. Kallioras and I. Giougis**

Comment CDE: the present report is not the result of a stakeholder workshop conducted with the WB3 / WP 3.1 methodology, though the same report format was used.

Explanation by DUTH team: The workshop was performed after carefully studying the WB3.1. Guidelines. However: 1) We did not use the exact methodology and especially the exercises. The farmers in our region are able to understand the water and biomass cycles. Many of them are educated. 2) Our laboratory (and especially our Professors) have more than 25 years of close interaction with local people and municipal authorities and have conducted numerous workshops and seminars concerning sustainable groundwater use and soil conservation issues.

In this workshop, which was the introduction to the DESIRE project, we focused on the current status of soil and water quality (based on our research results) and traditional methods for soil reclamation. Novel approaches for soil reclamation have been identified from the literature and will be presented during the 2nd workshop in order to be discussed with the farmers and stakeholders.

I General information

A) Workshop

Workshop venue: **Erasmio, Prefecture of Xanthi, Greece**
 Workshop moderator(s): **Prof. Dr. I. Diamantis, Prof. Dr. Ir. F. Pliakas**

List of workshop participants:

Mr. / Ms.	First name, name	Stakeholder category / institution (e.g. land user, researcher, NGO, GO)	Local or external participant? (L / E)
Mr.	Giannakoudis Mixalis	President of Local Agricultural Association – Farmer	L
Mr.	Gounari Aggeliki	Agriculturist – Director of Land Reclamation Works	L
Ms.	Xatzopoulou Menia	Geologist – Land Reclamation Works	L
Ms.	Koutroulou Zoi	Agriculturist	L
Ms.	Paraskelidis Xaralampos	Agriculturist	L
Mr.	Xidakis Georgios	Professor DUTH	L
Mr.	Apostolidis Nikolaos	President	L
Mr.	Goulas Athanasios	Farmer	L
Mr.	Goulas Dimos	Farmer	L
Mr.	Papaxristodoulidis Kostas	Farmer	L
Mr.	Gkourtsas Dimitris	Farmer	L
Mr.	Gkourtsas Dimos	Farmer	L
Mr.	Sakopoulos Theodosis	Farmer	L
Mr.	Kroustalis Zisis	Farmer	L
Mr.	Kontopoulos Dimitris	Farmer	L
Mr.	Katsakis Stefanos	Farmer	L
Mr.	Roidos Giorgos	Farmer	L
Mr.	Kioses Giorgos	Farmer	L
Mr.	Kyriakidis Athanasios	Farmer	L
Mr.	Tsamourtzis Ioannis	Famrer	L
Mr.	Koutsomizalis Ioannis	Farmer	L
Mr.	Aren Memet	Farmer	L
Mr.	Mavridoglou Triantafillos	Farmer	L
Mr.	Pournarakis Kostas	Farmer	L
Mr.	Giannopoulos Ioannis	Farmer	L
Mr.	Efrentopoulos Iordanis	Farmer	L
Mr.	Magginas Vasileios	Farmer	L
Mr.	Kalligas Kostas	Farmer	L
Mr.	Karagkiozidis Nikolaos	Farmer	L
Mr.	Tsiligiris Kostas	Farmer	L
Mr.	Mekakas Mixalis	Farmer	L
Mr.	Karapantziou Theodoros	Farmer	L
Mr.	Mpirmpilitas Fotis	Farmer	L
Mr.	Ferouf Oglou Xalit	Farmer, stock-breeder	L
Mr.	Matziris Spiros	Farmer, stock-breeder	L
Mr.	Bafeiadis Ioannis	Retired farmer	L
Mr.	Argiriou Arxontis	Retired farmer	L
Mr.	Tsalikis Athanasios	Retired farmer	L

B) Background

Overall aim of the workshop was to present traditional methods to combat soil salinization.

Specific objectives included:

- Exchange experiences between researchers, farmers and stakeholders
- Presentation of the scientific terminology to farmers and stakeholders
- Development of confidence and cooperation between farmers, researchers and stakeholders
- Identification of reclamation methods
- Selection of the most promising methods for field evaluation

Workshop program:

08:30-09:00: Welcome – Registration

09:00-09:45: **Opening of the Conference - Introductory notes – Authorities welcome notes**

09:45-10:15: Coffee break

10:15-10:45: Prof. Dr. F. Pliakas: «Presentation of the European Project: Desertification mitigation and reclamation of land»

10:45-13:00: **General Presentations**

A. Ziogas, Geologist: «*Current status of soil quality in East Nestos Delta basin*»

I. Giougis, Geologist: «*Current status of groundwater quality in the East Nestos Delta Basin*»

Dr. V. Diamantis, Environmental Engineer: «*Traditional methods to combat soil salinization*»

13:00-14:30: Lunch break

14:30-17:00: **Presentations of the involved authorities**

Em. Sarantidis, Agricultural Engineer, Director Association Agricultural Cooperatives: «*Tolerance of crops to soil salinity*»

17:00-17:30: Roundtable

Abstracts

“Current status of soil quality in East Nestos Delta basin” by **A. Ziogas**

Description of natural and anthropogenic (human) environment in the study area, description of the present conditions (aerial photos, photographs, chemical analyses results). Presentation of the desertification processes in time and spatially. Causes and impacts.

“Current status of groundwater quality in the East Nestos Delta Basin” by **I. Giougis**

Water cycle, preventions (climate changes and impacts in desertification, land use changes during the last 50 years), impacts on ecosystems, extensive over-pumping of groundwaters, seawater intrusion and groundwater chemical analyses results, identification of vulnerable and degraded areas.

“Traditional methods to combat soil salinization” by **Dr. V. Diamantis**

Presentation of the water cycle with emphasis on salt accumulation on agricultural land. Causes for soil salinization and characteristics of saline and sodic soils. Presentation of strategies for improvement, preservation and protection of saline and sodic soils in the study area.



Photo 1a. Welcome speech by Prof. Dr. I. Diamantis



Photo 1b. presentation of the Desire project by Prof. Dr. Ir. F. Pliakas



Photo 2. Workshop participants



Photo 3a. Presentation by A. Ziogas



Photo 3b. Presentation by I. Giougis



Photo 4. Presentation by Dr. Ir. V. Diamantis



Photo 5. Presentation by Em. Sarantidis, Agricultural Engineer

II Results and conclusions from sequences / exercises

1) Impact chains – chains that link causes and effects of land degradation

(→ results from Exercise 2: the water and biomass cycles)

A. Disturbances identified in the water and biomass cycles

Salinization of irrigation water.

One of the most important environmental problems of the study area is the phenomenon of seawater intrusion into the coastal unconfined aquifer of eastern Nestos Delta, as a result of a combination of anthropogenic activities with negative impacts on the hydrologic and hydrogeologic regime of the entire area. The main activities mentioned before are the drainage of coastal areas in order to provide areas for agricultural development, the channelization and alignment of Nestos River and finally the extensive overpumping of the phreatic aquifer for irrigation purposes (a practice which takes place continuously up to date).

B. Causes and effects of land degradation (→ impact chains)

Effect of irrigation water quality. Continuous irrigation with poor quality water for approximately 20-30 years has resulted in the formation of saline and sodic soils with distinct physical and chemical characteristics. Poor drainage and formation of impermeable clay layer has been observed in several soils in the study site.

Effect of climatic conditions: Decreasing rainfall results in poor salt leaching from the soil profile and recharge of groundwater

Effect of shallow groundwater table: This is the cause of salinization for soils situated in the low lying regions adjacent to the coast. In this region, the groundwater is saline the level is lower than 1 m from soil surface which results in continuous accumulation of soluble salts in the surface soil due to evaporation. Many hectares of land in the coastal low lying regions consist of natural saline soils and salt marshes.

C. Socio-cultural, economic, political, and legal constraints

-

D. Already applied solutions at the local level

- a) ***Use of freshwater.*** For this reason farmers pump water from adjacent streams and transport it several Km through private network. Local authorities permits farmers to use surface water for irrigation but does not allow to open new well especially in the areas where excessive deterioration of groundwater quality occurs. However, farmer are still make use of groundwater for irrigation.
- b) ***Use of gypsum.*** Some farmers have used gypsum to improve salinity problems. Gypsum application lacks scientific background and verification

- c) **Use of press mud.** This material is a by-product of sugar processing. It has been applied in the past for soil improvement but proved not to be adequate for sodic soils.
- d) **Use of winter rainfall.** Winter rainfall can be used both as a management tool to temporarily improve surface soil quality (for the proceeding summer cultivation period) and to cultivate winter crops. Winter rainfall can be managed in addition with gypsum application. Since freshwater is scarce in the region under consideration winter crops cultivation is performed in several cases.
- e) **Drainage improvement.** The local authorities often perform maintenance work for the surficial drainage systems of the area, including digging and weed removal.
- f) **Soil internal drainage.** Several farmers applied deep tillage for drainage improvement. However, this is accomplished without scientific support and as a consequence an undesirable hardpan layers is formed again.
- g) **Seeding placement.** The placement of seeds is especially important since salts accumulated in the ridge area.

2) List of local indicators for land degradation and conservation

(→ results form Exercise 3)

Indicator	Used by (stakeholder group)
Climatic conditions	
Temperature	
Rainfall	
Evaporation	
Irrigation water	
Consumption	
Groundwater level	
Electrical conductivity	
Soil quality	
Moisture content	
Electrical conductivity	
Crop production	
Productivity	Farmers
Land use	
Area of irrigated land	
Area of arable land	
Area of winter crops	

3) List of stakeholders and their influence and interest in regard to sustainable land management

(→ results form Exercise 4)

Stakeholder / stakeholder group	<u>Influence</u> on the sustainability of land use?	<u>Motivation / interest</u> in the implementation of sustainable land management?	Comments
Xanthi Prefecture, District of Agriculture, Administration of Landed improvements	Significant	Water and soil quality control	-
Region of Eastern Macedonia-Thrace, Department of Water Management, Ministry of the Environment, Physical Planning & Public Works	Significant	Water quantity and quality, water management	-
Farmers	Critical	Financial, employment	-
Association Agricultural Cooperatives	Significant	Financial, Selection of suitable plant species	-

4) Selection and appreciation of locally applied technologies and approaches (→ results from Ex. 7)

Please fill in the following table for different stakeholders:

4.1. Assessment made by local stakeholders:

Technology / approach	Already applied or potential solution?	On land use type (e.g. crop land / grazing land, etc.)	Labour required (initial and maintenance)	Costs (initial and maintenance)	Impact / Effectiveness						Limiting factors / constraints	Overall assessment of the potential for the local context
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Freshwater irrigation	Applied in limited area adjacent streams	Crop land	Medium	High	++	++	+	+	++	++	Network construction, pumping station installation, operation (fuel) and maintenance	+++
Gypsum application	Applied by individual farmers	Crop land	Low	High	++	++	-	++	++	++	Gypsum costs (purchase and transport), spreading equipment	++
Pressmud application	Applied by individual farmers	Crop land	Low	Low	0	0	+	+	0	0	Pressmud transport and spreading	0
Winter crops	Already applied	Crop land	Low	Low	+	+	0	0	0	0	Low income for the farmers	+
Drainage improvement	Already applied	Crop land	High	High	+	++	+	+	+	+	Labor, equipment costs, digging, weed removal	+++
Internal drainage improvement	Applied by individual farmers	Crop land	Low	Low	++	++	+	+	+	+	Deep ploughing equipment	++
Seed placement	Applied by individual farmers	Crop land	Low	Low	+	+	0	0	0	0	n/a	++

Legend:

ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: +++ (very positive), ++ (positive), + (slightly positive), 0 (medium),

- (slightly negative), -- (negative), --- (very negative)

4.3 List of technologies / approaches to be evaluated by WOCAT methodology (result from Ex. 7)

The following technologies will be documented and evaluated with the help of WOCAT questionnaires:

1. Freshwater transport
2. Deep ploughing (soil internal drainage improvement)
3. Drainage system maintenance (groundwater level control)
4. Gypsum addition

4.4 Draft outline of a strategy for sustainable land management (Ex. 8)

A sustainable land management strategy in the study region consists of:

1. Transportation of freshwater (construction of large distribution network)
2. Drainage improvement (new drainage canals and maintenance of existing)
3. Reclamation of degraded land
 - Internal drainage improvement (deep ploughing, installation of perforated pipes or ditches)
 - Removal of exchangeable sodium (gypsum addition)
 - Salt leaching (freshwater flushing)

In cases where freshwater transportation is not possible:

1. Use of winter crops (winter wheat)
2. Use of gypsum to improve soil quality in combination with winter rainfall
3. Irrigation control and timing
4. Soil moisture content and soil salinity monitoring and control by irrigation (Maintenance of soil moisture and salt content at optimum level by using appropriate monitoring equipment)

III Evaluation of the workshop (Ex. 9)

Within the merits of the DESIRE project, the first Workshop was organized in Erasmio, Xanthi (19 December 2007). The workshop consisted introduction to the DESIRE project by presenting the objectives and activities of the project. Additionally, recent data concerning groundwater and soil quality of the study region were presented. Finally, traditional methods for soil reclamation were described. In the second seminar novel methods for soil reclamation will be presented and evaluated.

The DUTH team has close interactions with the farmers of the region at local level. During the period July-September 2008 five (5) meetings and visits to degraded land have been scheduled in the study region. The objectives of these actions are to provide:

- **Assistance to local farmers in relation to characterization of soil quality and identification of causes and possible reclamation strategies and**
- **Advertisement of the following seminar (end of September 2008)**

IV Other information

Difficulties encountered: None

Changes made concerning the procedure suggested in the workshop guidelines:
None

How was the interest and participation of the different stakeholder groups in the workshop? There were participants from all the stakeholder groups

Recommendations: -

Comments: -

Annex 1: Workshop poster

ΕΝΗΜΕΡΩΤΙΚΗ ΗΜΕΡΙΔΑ

ΜΕ ΘΕΜΑ

**«ΕΡΗΜΟΠΟΙΗΣΗ ΤΩΝ ΕΛΔΑΦΩΝ:
ΥΠΑΡΧΟΥΣΕΣ ΚΑΙ ΝΕΕΣ
ΣΤΡΑΤΗΓΙΚΕΣ ΠΡΟΛΗΨΗΣ ΚΑΙ
ΒΕΛΤΙΩΣΗΣ»**



ΤΕΤΑΡΤΗ 12 ΔΕΚΕΜΒΡΗ 2007-11-20

ΩΡΑ ΕΝΑΡΞΗΣ: 9:00 πμ

ΣΥΝΕΔΡΙΑΚΟ ΚΕΝΤΡΟ ΕΡΑΣΜΙΟΥ

ΕΡΑΣΜΙΟ ΕΑΝΘΗΣ

ΟΡΓΑΝΩΣΗ:

ΕΡΓΑΣΤΗΡΙΟ ΤΕΧΝΙΚΗΣ ΓΕΩΛΟΓΙΑΣ,
ΤΜΗΜΑ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ,
ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ