

Good Practice Workshop, Larnaca 10-11 Feb 2014

“Climate change mitigation and adaptation in the RDPs: assessing the scope and measuring the outcomes”

The Rural Development Program Strategy for water stressed and scarcity

Case Study **Cyprus**

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Presentation Contents

- Introduction
- Addressing climate change challenges through RDPs
- Conclusions and lessons

BACKGROUND INFORMATION

- An island in the North Eastern Mediterranean sea
- Area of 9.241 km² (63% Government control, 37% under occupation by Turkish Drops)
- Average precipitation 500 mm / year reducing at a rate of 1 mm per year since 1970
- No perennial streams (but with deep alluvial beds)
- Population approximately 870.000 in 2014 (74% urban and 26% rural)

BACKGROUND INFORMATION

- Cyprus joined EU (2004) harmonizing legislation and implementing WFD and other environmental directives
- Water in Cyprus is a key natural resource because agricultural production depends to a great extent upon its adequacy
- Available water in Cyprus depends 95% on rainfall which is varying from year to year
- Water in Cyprus is scarce with high cost
- During the last 40 years Cyprus has suffered from 9 drought events of meteorological droughts which developed into hydrological droughts with rainfall between 60-85 %

WATER DEMANT IN CYPRUS

Domestic use 85 mln.c.m (30%)
including tourism and industry

Agriculture 185 mln .c.m.(70%)
Government Water Works and
Boreholes



STAKEHOLDER ANALYSIS IN WATER CRISIS SITUATION

Water Boards
(semi governmental
organizations)

Farmers Union
(non governmental
organizations)

Ministry of Agriculture
Natural Resources and
Environment

Department of
Agriculture

Department of
environment

Water Development
Department

Meteorological
Service

STAKEHOLDER ANALYSIS IN WATER CRISIS SITUATION

| Stakeholder | Variable of Interest | Priority and compromises |
|---------------------------------|---|---|
| Farmers | Irrigation Water | Second priority after domestic demand. Priorities for permanent crops and greenhouses. Demand for compensations for loss of income due to drought |
| Domestic water consumers | Satisfactory quantities to meet basic needs | Top priority. Guarantee minimum quantity. Secure supply to all consumers irrespective of location. Pay more for more secure sources |
| Environmentalist | Preserve environment | Priorities vary. Secure minimum quantities for environment preservation |
| Urban water supply institutions | Secure, satisfactory quantities of water | Improve domestic water supply reliability and increase water quantities available to meet increasing demand |
| Water Development Department | Secure enough infrastructure to meet water demand | Apply integrated water management and water demand management. Apply drought mitigation plans. Secure safe reliable water sources |

DURING THE LAST DROUGHT 2008-2009



Kouris Dam

The largest dam of Cyprus with a total storage capacity of 115 mil. metric tons. The Dam provides water for irrigation at a distance of 110 km to the south east part of the island as well as water to the cities of Nicosia and Limassol .

The Dam has dried out completely in mid August 2008.

DURING THE LAST DROUGHT 2008-2009



Yermasogia dam

- Low rainfall had devastating effects on agriculture. Total direct damages to agriculture are estimated at €135 mil.
- In addition, as the available quantity of water stored in dams dropped at critical levels, the Government decided to uphold the supply of water to agriculture.

Cereals suffering from low rainfall

Lack of moisture has stopped the
growing of plants



Dying citrus trees in the heart of the best growing area of Cyprus

Lack of moisture has stopped the growing of plants



As the supply of irrigation water from Government Water Works is discontinued some of the best citrus-groves of Cyprus are lost



Total production losses in areas depending on public irrigation supplies account for 80% of average production values

Potatoes: the main export crop of Cyprus. Production has dropped by 40% due to the scarcity of irrigation water



Production has dropped by 40% due to the scarcity of irrigation.
As from early 2008 the Government has halted the supply of irrigation water to
the main producing regions. Extensive producing areas remained idle.
water



Low rainfall has led to the scarcity of straw and natural vegetation for the feeding of small ruminants

Average production of sheep and goat milk has dropped by 24% due to poor grazing



Drilling at the bottom of the empty dam of Yermasoyia in search of underground water



More drilling for emergency supplies of water.....Even with successful drilling, the water balance cannot be restored.

In order to satisfy the needed quantities, water must be transported from abroad. The construction of necessary infrastructure was expedited in order to unload shipments of water arriving from Greece.



Emergency drought relief operations

- **Each day a tanker loaded with Greek water arrives to the east of the port of Limassol carrying on average 40-50 thousands m. tons of water. In total 8 mil. m. tons of water transported by tankers.**
- **The total cost for the transport, discharge and distribution of water was € 57.5 mil.**

By the end

As Cyprus continues its efforts to manage the water crisis on the island, no stocks of water are available for agricultural use.

Many farmers have completely lost their income from agriculture and cannot cope neither with existing loans nor with the financing of the upcoming crop.

The risk of abandonment and desertification is evident.

Cyprus was seek the support and solidarity of the EU in managing the vast economic, social and environmental repercussions of the drought

Addressing climate change challenges through RDPs

SUBSIDIES THROUGHOUT THE RDP 2007-2013

DIRECT MEASURES

- Installation of pressurized irrigation systems (P.I.S.)
- Tank for rain water harvesting for reuse for irrigation purposes

INDIRECT MEASURES

- Agroenvironmental measures, especially crop rotation

APPLICATION OF P.I.S

Application of P.I.S increase efficiency and water uniformity comparing with traditional irrigation methods up to 95%.



EFFICIENCY OF IRRIGATION

| Traditional method of irrigation | Pressurized Irrigation Systems |
|----------------------------------|--------------------------------|
| Open canals, surface irrig. 40% | Mini sprinkler 70 - 85% |
| | Sprinkler 60 - 70% |
| | Drippers 80 - 95% |

- Each 100 ton. Of water applied :**
- **we have water losses of 60 t. (trat. method)**
 - **we have water losses of 5-20 t. (p.i.s)**
- Due to surface run off and deep percolation**

WATER HARVESTING

Rain water harvesting from the roof greenhouses



MEASURES TAKEN TO ALLEVIATE / MITIGATE DROUGHT CONDITIONS

- Investment measures of RDP
- Agroenvironmental measures of RDP
- Area reduction of annual crop
- Avoid to plant new permanent plantations
- Promotion of less water demanding cultivations
- Irrigation for survival of Permanent crops
- Application of quota system for water allocation
- Advise the farmers on irrigation
- Avoid to irrigate during windy and warm conditions
- Application of penalty charges for over consumption
- Water harvesting from roofs of greenhouses
- Emphasis of the use of low quality, or marginal water
- Use of recycle water mainly for agricultural purposes
- Awareness campaigns

RECYCLE WATER USE

Distribution network



Agricultural use (e.g corn for silage)



CONCLUSIONS / FUTURE TRENDS TO COPE WITH WATER SCARCITY

- Rearrangement of crops
- Use of recycled water
- Use of marginal quality water
- Increase education campaign
- Increase the yield per unit of water applied by improving :
 - Fertigation
 - Application of real water requirements
 - Use of advanced irrigation technology
- Innovation measures through RDPs

THE NEW RDP 2014-2020

- **Maintenance / repairs of small scale irrigation infrastructure schemes**
- **Under the article 46-Reg. EE1305/2013, among others, only the new irrigation systems which can save between 5- 25% of water related to the previous irrigation system can subsidies**
- **Tanks for rain water harvesting from the roof greenhouses**
- **Distribution network for recycle water in agri. areas**
- **Application of intelligent systems for recording and management of irrigation networks in order to save resources and energy by optimizing the existing infrastructure.**
- **Agroenvironmental measures of RDP**

**Thank you
for your attention**