PORTUGAL: LAND CONSOLIDATION IN MONDEGO FOR FLOOD PROTECTION AND IN LUZ FOR DAM CONSTRUCTION

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Hydraulic and Agricultural Development Project in Mondego

Mondego

River Mondego

- Hidrographic basin:
  - area: 6.645 km²
  - length: 258 km
- River spring – mountain area, 1.425m above sea level
- River mouth – Atlantic ocean

Terminal part river basin (last 40 km) – **Low Mondego**

Alluvial plain, aprox. 14.000 ha
About 6.000 agricultural farms, corresponding to 40.000 parcels (average 6,7 parcels/ farm)
Main crops: mainly corn and rice, also horticulture

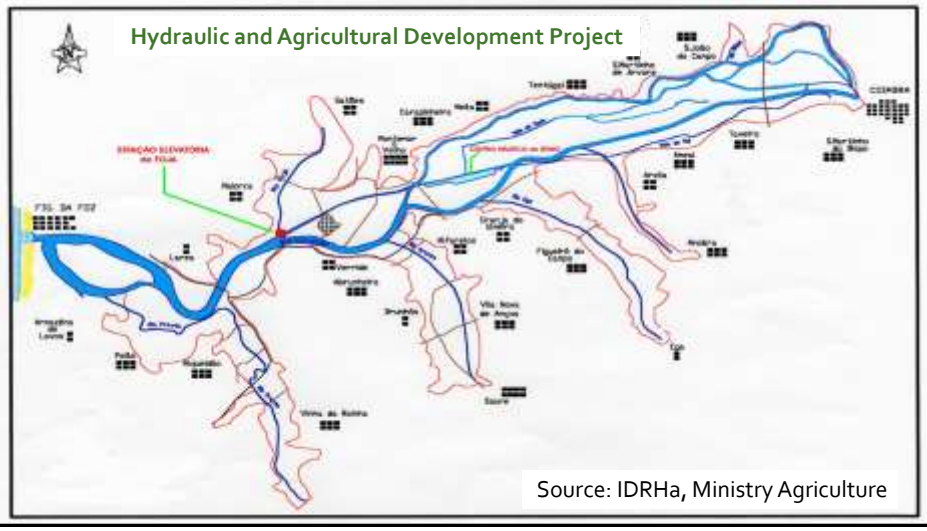
Mondego – (short) history

Frequent floods - since XIV century - human lives, infrastructures and equipments, crops.
Erosion in upper part of river basin: worsening floods + degradation of agricultural land.
Rural infrastructures (drainage, irrigation, rural roads) extremely degraded and inefficient, land ownership highly scattered. **Very fertile agricultural soils - becoming abandonned**.

First intervention - 18th century - Low Mondego - river course almost in straight line: didn't work!

In the 1960´s – plan for regularization of river flow: two dams (flood control, water supply, electricity), dykes (protection), change river's course (close to its original course in most parts), system for controlled flooding of agricultural areas in case of extreme situations, etc.
In addition, **improve conditions for agriculture**: land consolidation, irrigation, drainage, rural roads.

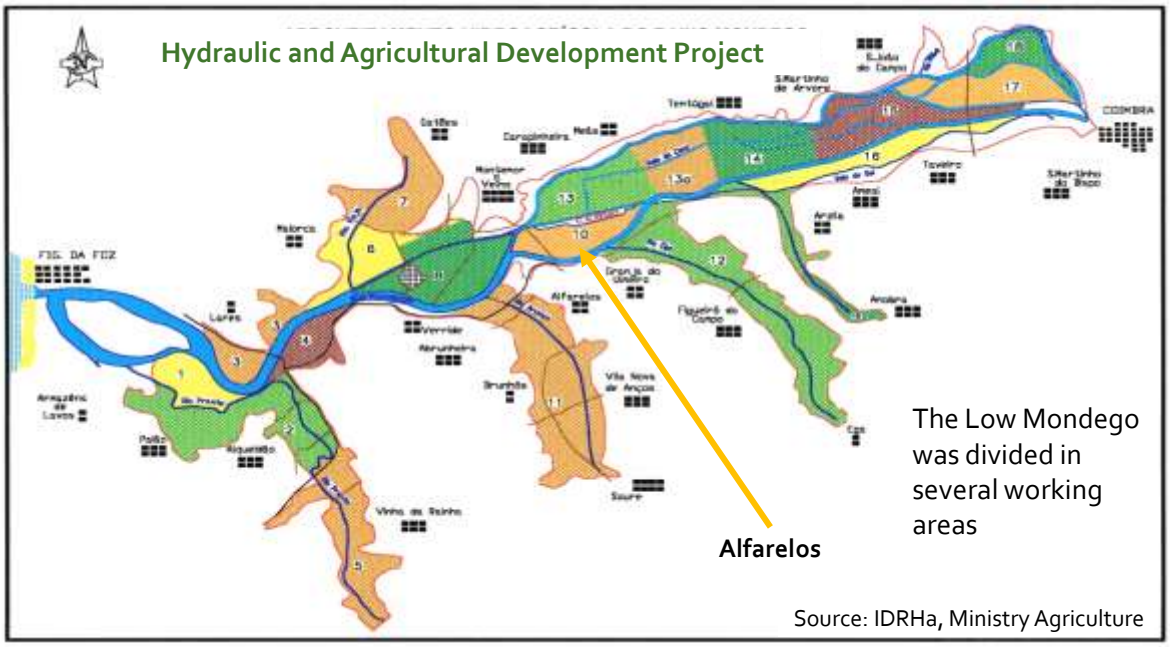
Hydraulic and Agricultural Development Project in Mondego



Project started in the 1970's

Total area:

aprox. 12. 300 ha



The Low Mondego was divided in several working areas

Hydraulic and Agricultural Development Project in Mondego

Collaboration between two Ministries:

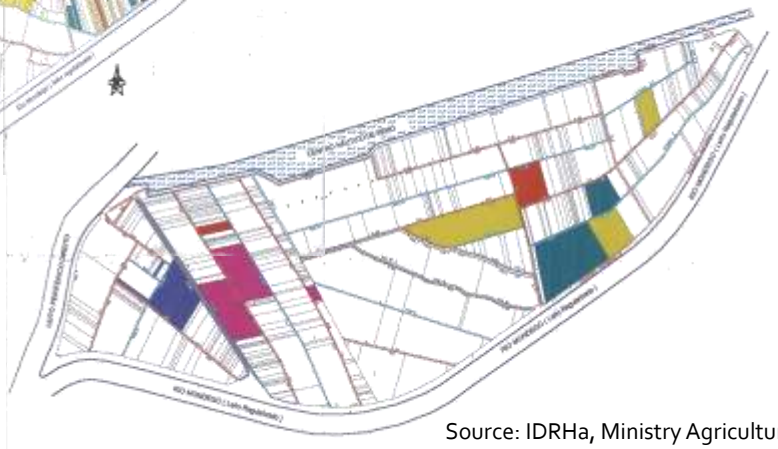
- Ministry of Environment - primary structure to control river Mondego flow, protect the valley from floods and supply water for irrigation system – expropriation (remaining land incorporated in land consolidation / land bank)
- Ministry of Agriculture - land consolidation and agricultural infrastructures (irrigation, drainage and rural roads – contribution rate); land bank (56 ha)

Procedures were similar in all working areas

Focus example - **Alfarelos** - 482 ha

Land Consolidation	Before	After
Nr. landowners	309	309
Nr. parcels	1.150	415
Nr. parcels / landowner	3,72	1,34
Area / ownership parcel (ha)	0,42	1,11
Parcels without road access	168	0

Land ownership - before LC

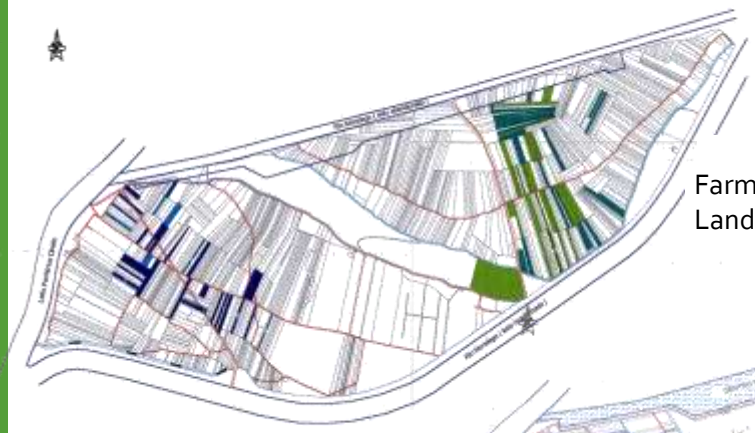


Land ownership - after LC

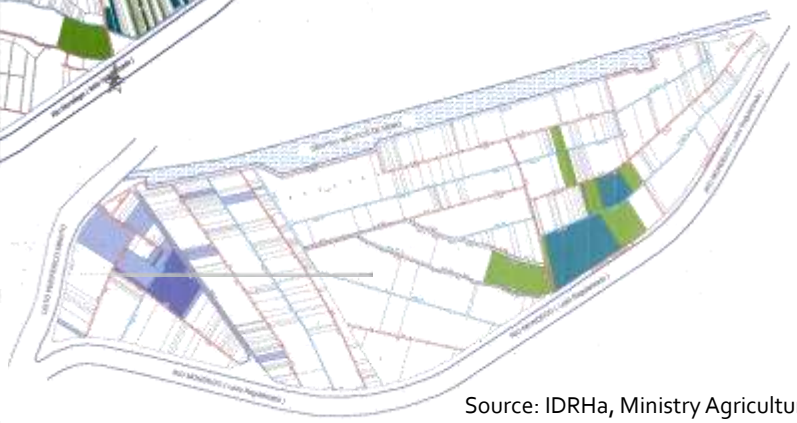
Alfarelos

Source: IDRHa, Ministry Agriculture

Most farms have mixed tenure: partly owned, partially under lease (majority of area)



Farm structure before Land Consolidation



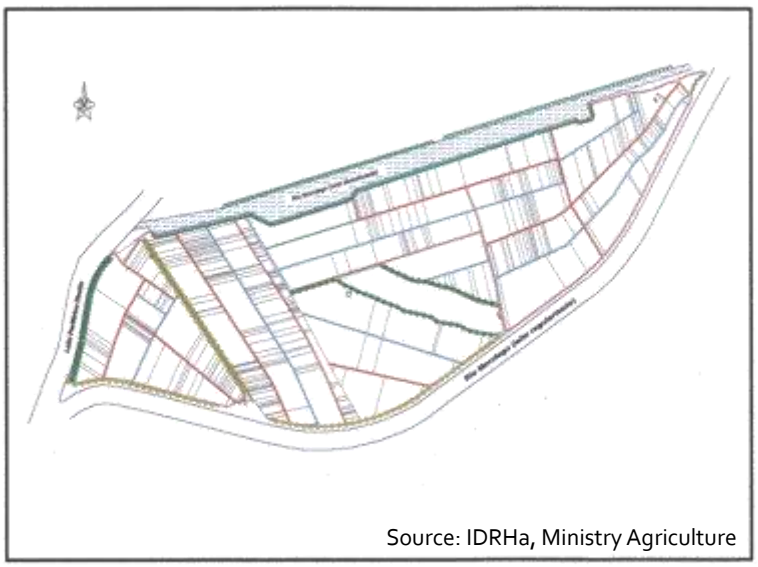
Farm structure after LC

Alfarelos

Source: IDRHa, Ministry Agriculture

Environmental Impact Assessment

- Compulsory by law
- Mitigation measures:
  - Landscape – riparian vegetation (reposition), green structure (introduction)
  - Monitoring superficial and underground water



Source: IDRHa, Ministry Agriculture

Alfarelos

Timeline & costs (Alfarelos)

Timeline:

- First studies (broader) – start late 1980's
- EIA – 1999 / 2000
- Infrastructures and other works - 2001 / 2003
- LC project, approval by Resolution from Council of Ministers – 2002
- New parcels handover – 2003/2004

Costs (2006):

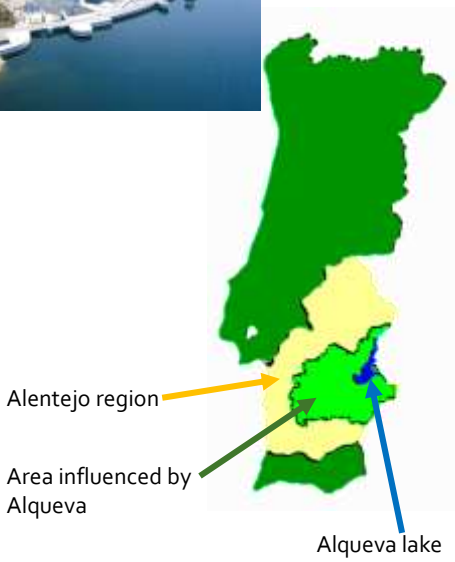
- Total costs – 4.084.420 €
- Land Consolidation (without infrastructures or other works) – 18.973 €
- Finnancing: EARDF & PT goverment

Luz parish – land consolidation project

Source: EDIA

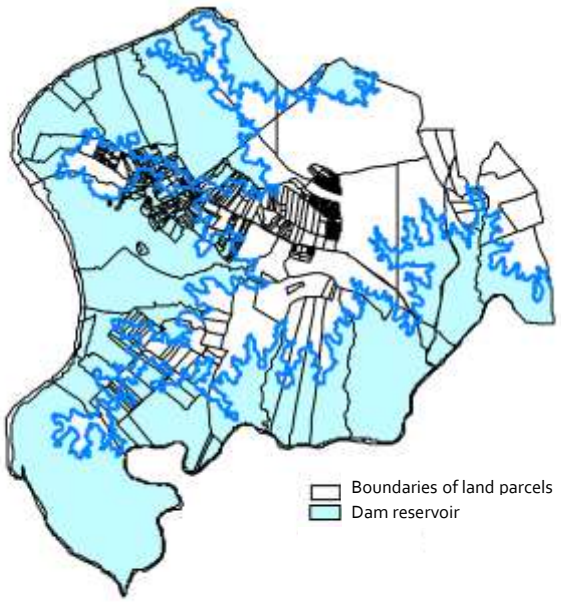
Luz – Alqueva enterprise

- Decision to build a dam for multiple purposes in river Guadiana, Alentejo, was taken in Dec 1975 by Ministers Council
- Alqueva entreprise includes several dams, power plants and irrigation system that covers 119.139 ha; total influenced area – 10.000 km², 20 municipalities
- Investment (total) - 2.500 milions euros
- Main purposes: water storage and supply (climate change), irrigation, power production, improvement of socio-economic situation in region (Alentejo was losing 6 persons per day average)
- In 1995 EDIA was created – public limited company that plans, develops and manages Alqueva enterprise
- Alqueva dam was inaugurated in 2002, one of the largest water reservoirs in Western Europe – 83 km long, area of 250 km²



Luz parish

- Luz is the parish that was mostly affected by the reservoir of Alqueva dam: old village partially submerged, as well as most of the parish surface (from 5.000 to 2.000 ha), road network interrupted
- To minimise the impact and to compensate, it was decided to:
  - build a new village – necessary area was expropriated and new settlement constructed by EDIA
  - establish a new road network
  - have a land consolidation project as a way to reorganize agriculture system and prevent migration out of the new village



Source: IDRHa, Ministry Agriculture

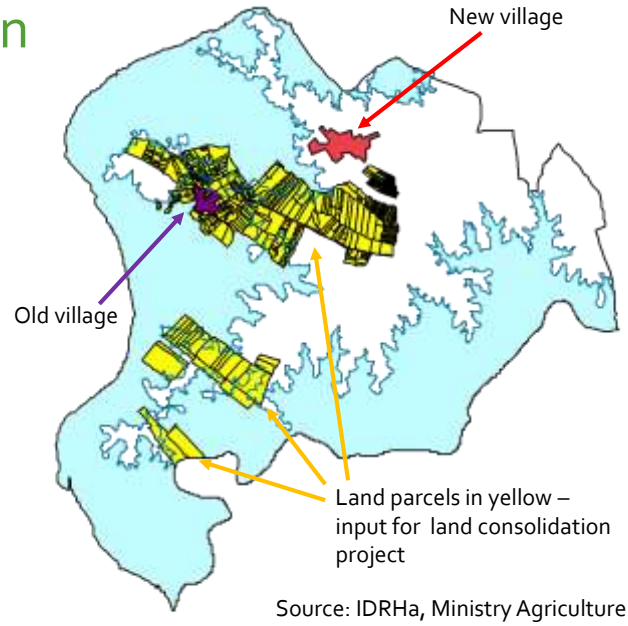
Luz village – old & new






Luz - land consolidation

- Remaining area - pre-existing agricultural activities (extensive cattle farming, traditional olive groves, cork oak forest and other forest) were not viable anymore.
- **LC WHY?** Reposition agricultural land around the new village (land mobility), improve structure of land parcels (consolidation & land bank), create new opportunities for agriculture (new land use plan, introduction of irrigation, etc.), new rural road network. Participatory process.
- Cooperation between EDIA and the Ministry Agriculture, IDRHa; cooperation with regional services of MoA
- EDIA indicated the land parcels that should be included in the LC project - **2.239 ha**



Source: IDRHa, Ministry Agriculture

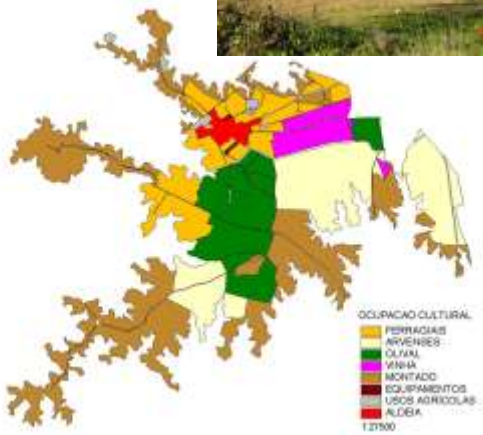
LC project – land use plan

Impact of Alqueva reservoir » need to restructure agriculture system » new land use plan

Reorganisation of the agricultural system – based on pre-existing system, natural resources, regional potential:

- introduction of irrigation (EDIA) – 591 ha
- olive grove conversion (MoA) – 290 ha; varieties, new plants; irrigated; adequate for mechanization
- vineyard – 80 ha; compensation in kind (EDIA); appropriate varieties for good quality wine, irrigated; mechanization; training for farmers; supply chain

Olive groves and vineyards - planted in such a way that they can be managed as a single unit, even if they belong to several landowners



Source: IDRHa, Ministry Agriculture

Luz – land consolidation

LC project – MoA, IDRHa

Project area - 2.239 ha

- land parcels reallotment
- rural roads and drainage networks
- land use plan, olive grove
- collective equipments
- landscape rehabilitation
- land bank

Source: IDRHa, Ministry Agriculture

LC project	Before	After
Nr. landowners	176	148
Nr. land parcels	481	243+115*
Area / land parcel (ha)	4,9	7,2

* 115 new parcels were created for compensation in kind (vineyard) and to relocate rural constructions

Luz – land consolidation execution

Reallotment	86.824	1.948 ha
Collective land improvements	71.939	290 ha
Road network	1.050.000	24 km
Drainage system	7.578	3 Km
Olive groves	537.041	290 ha
Collective facilities	1.374.700	4
Indemnities	95.400	-
Landscape rehabilitation	125.000	-
Vineyard	1.077.440	80 ha
Irrigation system	3.606.642	591 ha
Forestry	645.210	757 ha
TOTAL	8.677.774	

Timeline / duration:

- Project started late 1998
- Preliminary study – 10 months
- Project elaboration – 2 years
- Project execution – 3,5 years

Critical success factors

- Responsibilities – shared, clear and agreed from start; realistic / appropriate to each others competencies
- Coordination – at all levels; from day zero; regular; communication flow / channels
- Planning – well coordinated (time)
- Embeded in national / regional development strategy (political support)
- Necessary resources, particularly staff (local team); related to responsibilities
- Mandatory legal instrument(s)
- Awareness – time and costs

Thank you for your attention!

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