Evaluation of the energy crop Jatropha curcas as a mean to promote renewable and sustainable energy for the Mediterranean region (JatroMed)

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Title of the project: Evaluation of the energy crop Jatropha curcas as a mean to promote renewable and sustainable energy for the Mediterranean region (JatroMed)

JatroMed is a European Union funded project

Reference Call for Proposals : EuropeAid/128320/C/ACT/Multi)

Title of the Call for Proposals: Thematic Programme for Environment and sustainable management of natural resources, including energy

Contract Number: 2011 / 221-037

Duration: 4years (Start Date: 28 June 2011)

Budget: 1.817.496 Euro

JatroMed CONSORTIUM

COORDINATOR:

Agricultural University of Athens-Research Committee (AUA), GREECE

PARTNERS:

1) Consiglio per la Ricerca e Sperimentazione in Agricoltura Agricultural Research Council (CRA ING), ITALY

2) City for Scientific Research and Technology Applications (MuCSAT), EGYPT

3) Centre de Développement de la Région de Tensift (CDRT), MOROCCO

4) Centre de Développement des Energies Renouvelables (CDER), ALGERIA

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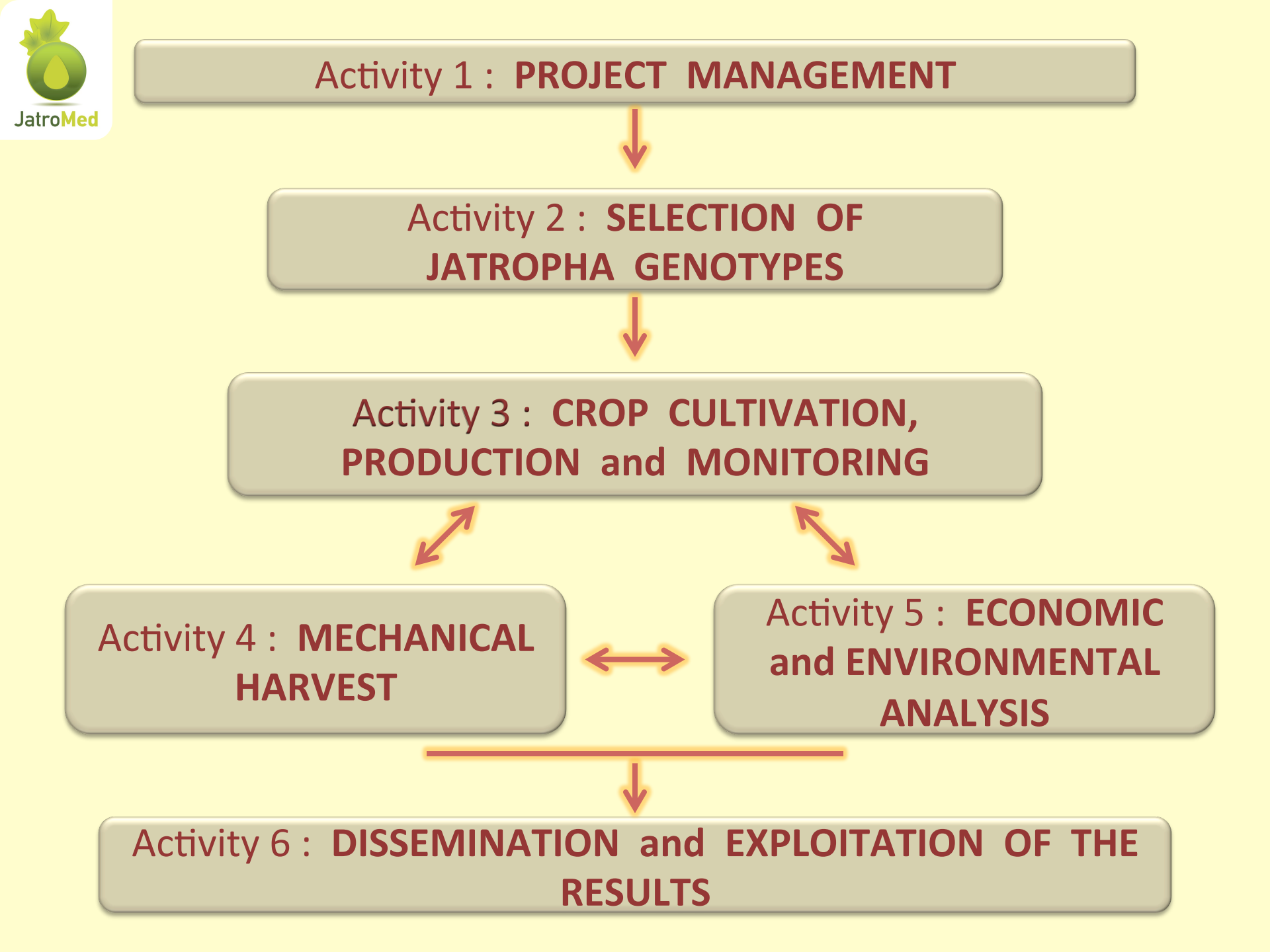
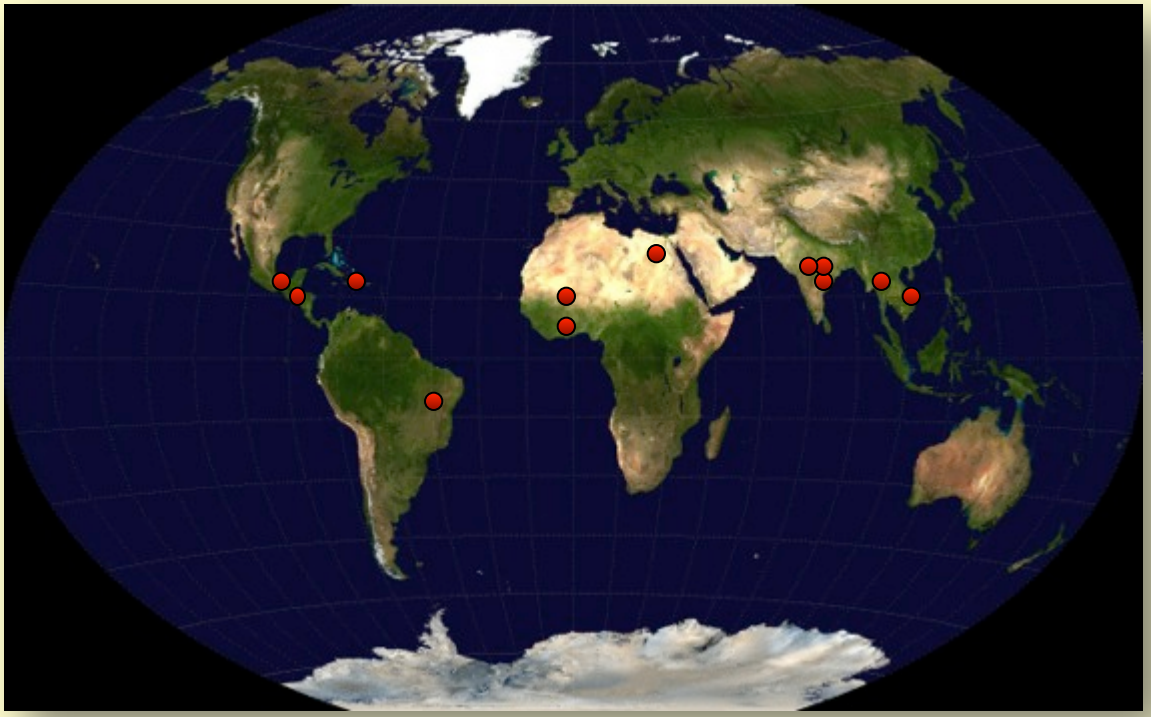
The JatroMed project aims to:

- ✓ reinforce and upgrade the natural and socioeconomic conditions of poor rural areas
- ✓ to give local populations the opportunity to produce sustainable energy to cover their own needs

- ✓ assess the adaptability of genotypes collected worldwide under the pedo-climatic conditions of the target countries
- ✓ evaluate the plant productivity under different fertilization, irrigation and pruning treatments


Activity 1 : PROJECT MANAGEMENT
Activity 2 : SELECTION OF JATROPHA GENOTYPES
Activity 3 : CROP CULTIVATION, PRODUCTION and MONITORING
Activity 4 : MECHANICAL HARVEST
Activity 5 : ECONOMIC and ENVIRONMENTAL ANALYSIS
Activity 6 : DISSEMINATION and EXPLOITATION OF THE RESULTS

Activity 2 : SELECTION OF JATROPHA GENOTYPES

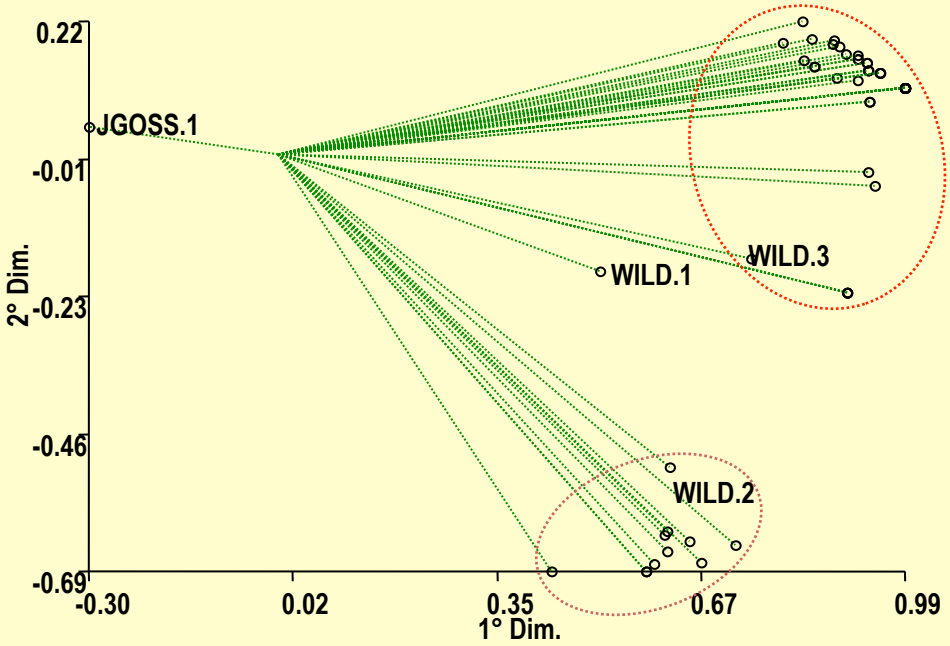


Geographical distribution of genotypes

Allocation of genotypes to target countries

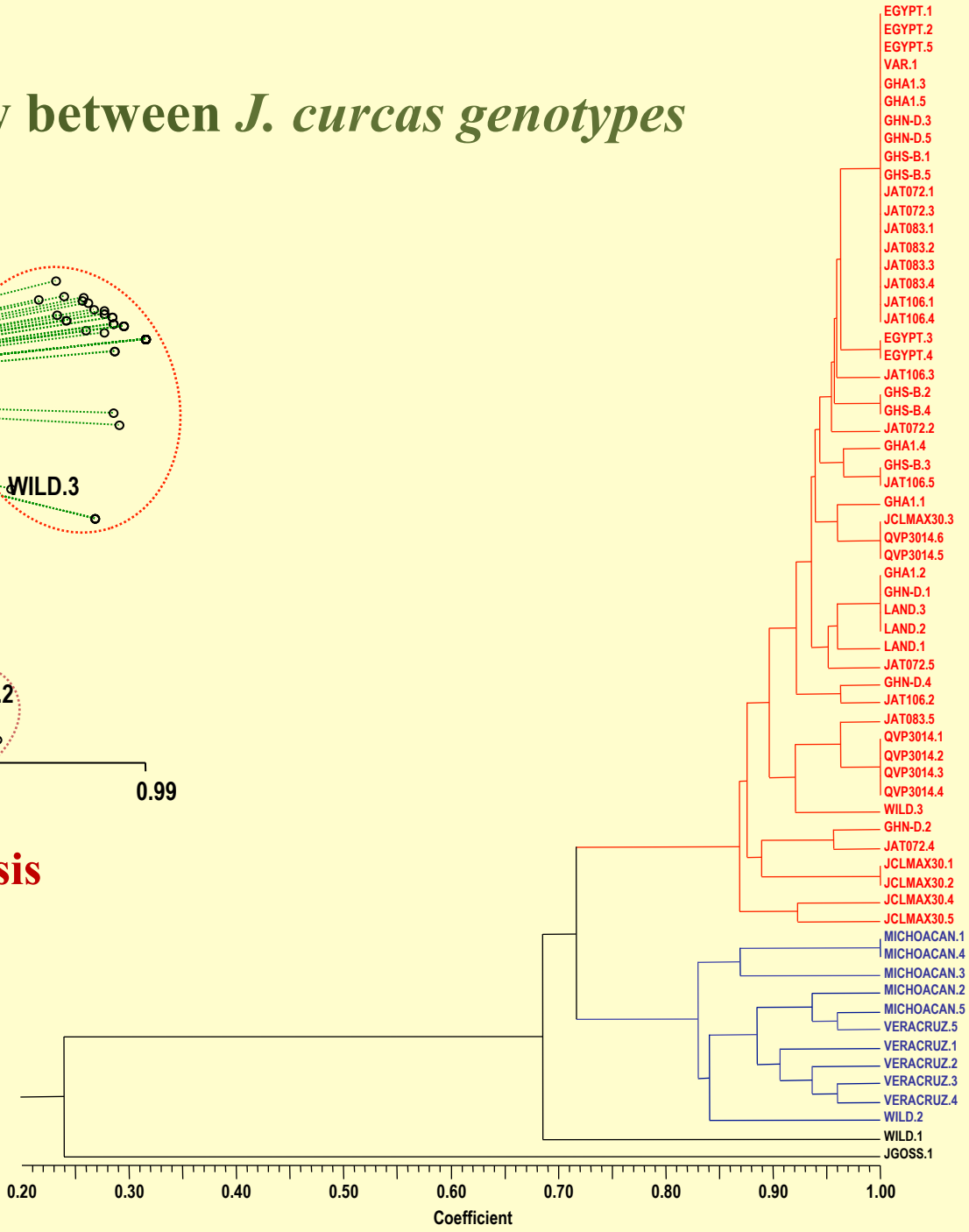
EGYPT	MOROCCO	ALGERIA
Michoacán (Mexico)	Michoacán (Mexico)	Michoacán (Mexico)
JCLMax 3.0 (India)	JCLMax 3.0 (India)	JCLMax 3.0 (India)
EJAT (Egypt)	GHA1 (Ghana) Mali	Veracruz (Mexico)
GHS-B (Brazil)	JAT072 (Vietnam)	JAT083 (Thailand)
JAT106 (India)	QVP 3014 (India)	GHN-D (Dominican Republic)

Genetic diversity between *J. curcas genotypes*



Principal Component Analysis

Cluster Analysis



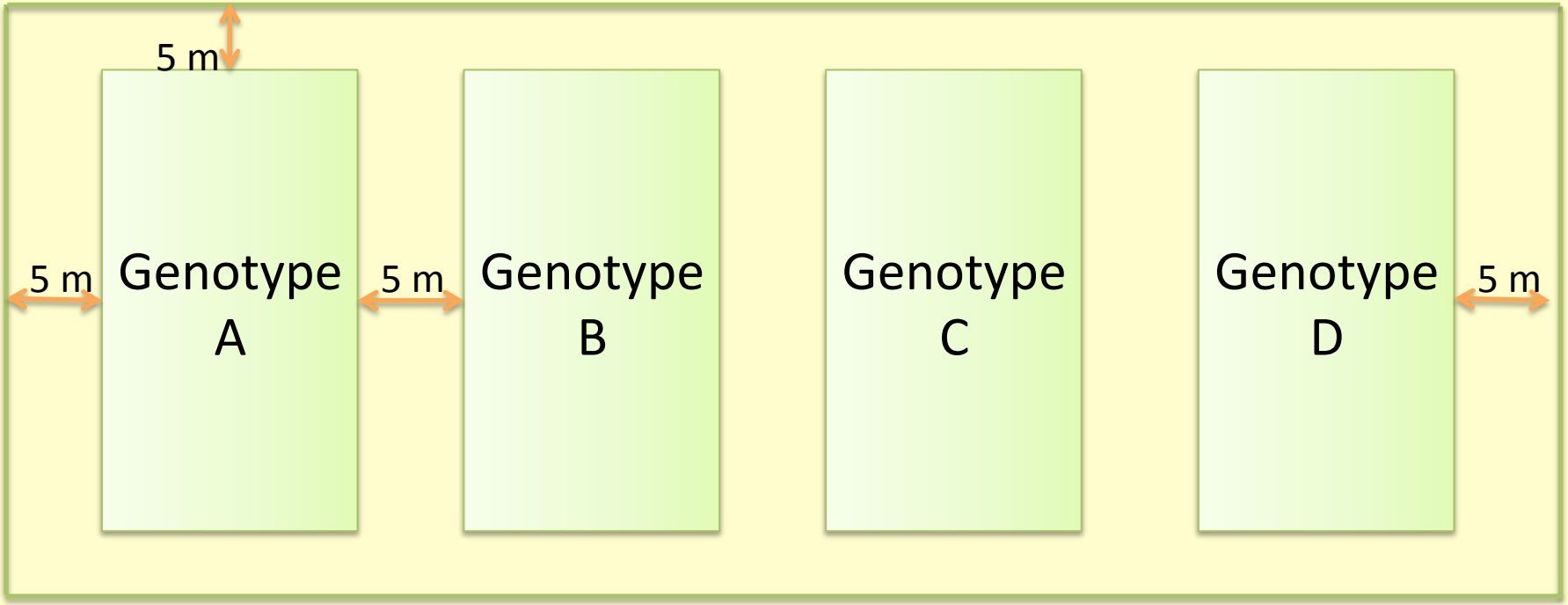
Activity 3 : CROP CULTIVATION, PRODUCTION & MONITORING

CDRT demo field in Essaouira

CDER demo field in Adrar

MuCSAT demo field in Borg El Arab

Area per country:	4 hectares
Area per genotype:	1 hectare
Distance between genotype fields:	5 m
Number of plots per genotype:	24
Total number of plots per country:	96
Surface of each plot:	279 m^2
Distance between plants:	between rows 3 m and within row 2.5 m
Number of plants per plot:	36
Number of plants per genotype:	864
Number of plants per country:	3456



TREATMENT A: Fertilization

Treatment A1: 10 g of urea per plant

Treatment A2: 10 g of 20 N-20 P-20 K per plant

Every month both doses will be increased by 5 g

TREATMENT B: Irrigation

Treatment B1: 4L/hour every 7 days

Treatment B2: 8L/hour every 7 days

TREATMENT C: Pruning

Treatment C1: Cup-shaped plants

Treatment C2: Tree-shaped plants

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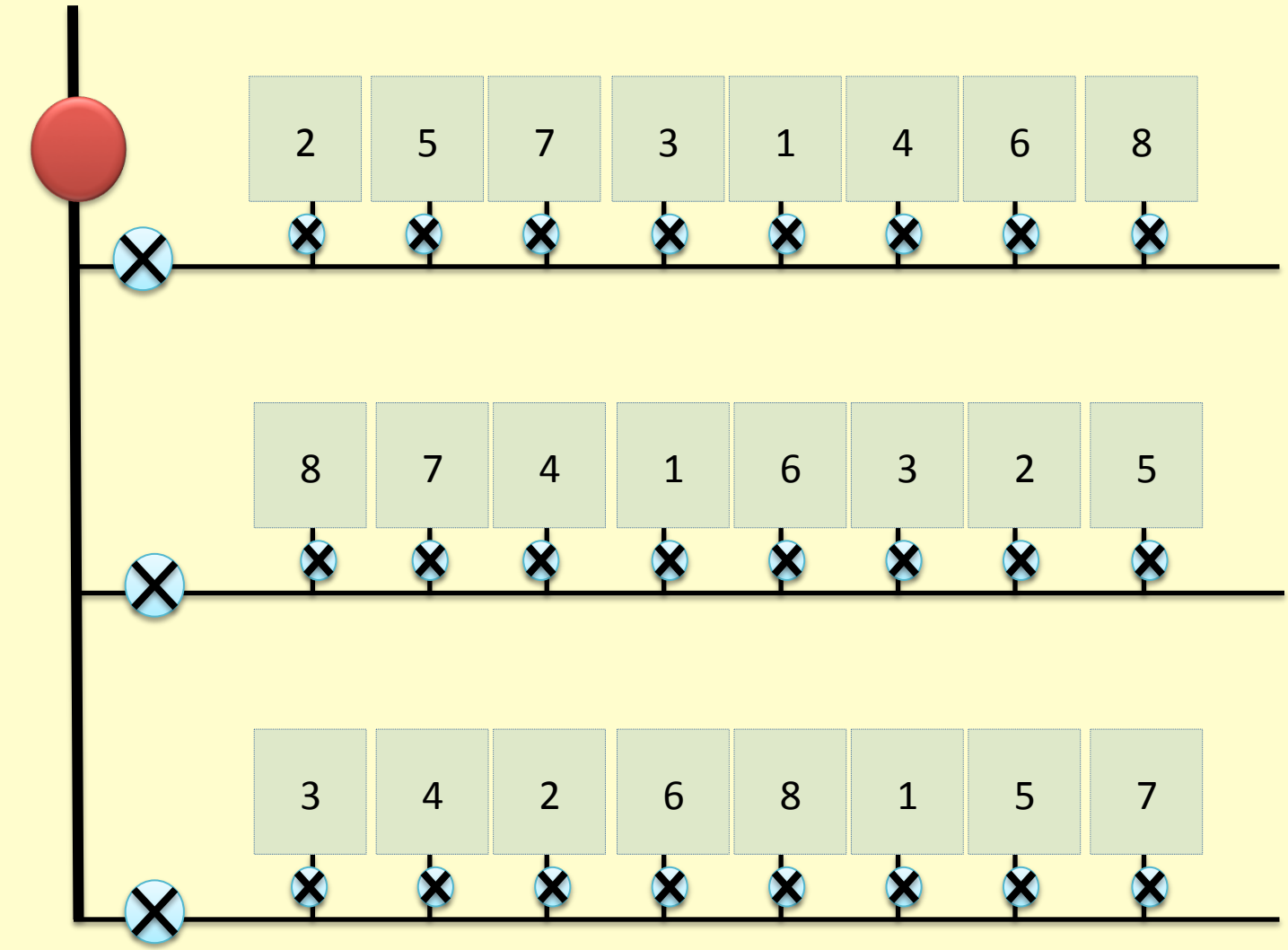
Treatment A : fertilization, with two types: A1 and A2
Treatment B : irrigation, with two levels: B1 and B2
Treatment C : pruning, with two shapes: C1 and C2

1	→	A1-B1-C1
2	→	A2-B1-C1
3	→	A1-B2-C1
4	→	A2-B2-C1
5	→	A1-B1-C2
6	→	A2-B1-C2
7	→	A1-B2-C2
8	→	A2-B2-C2



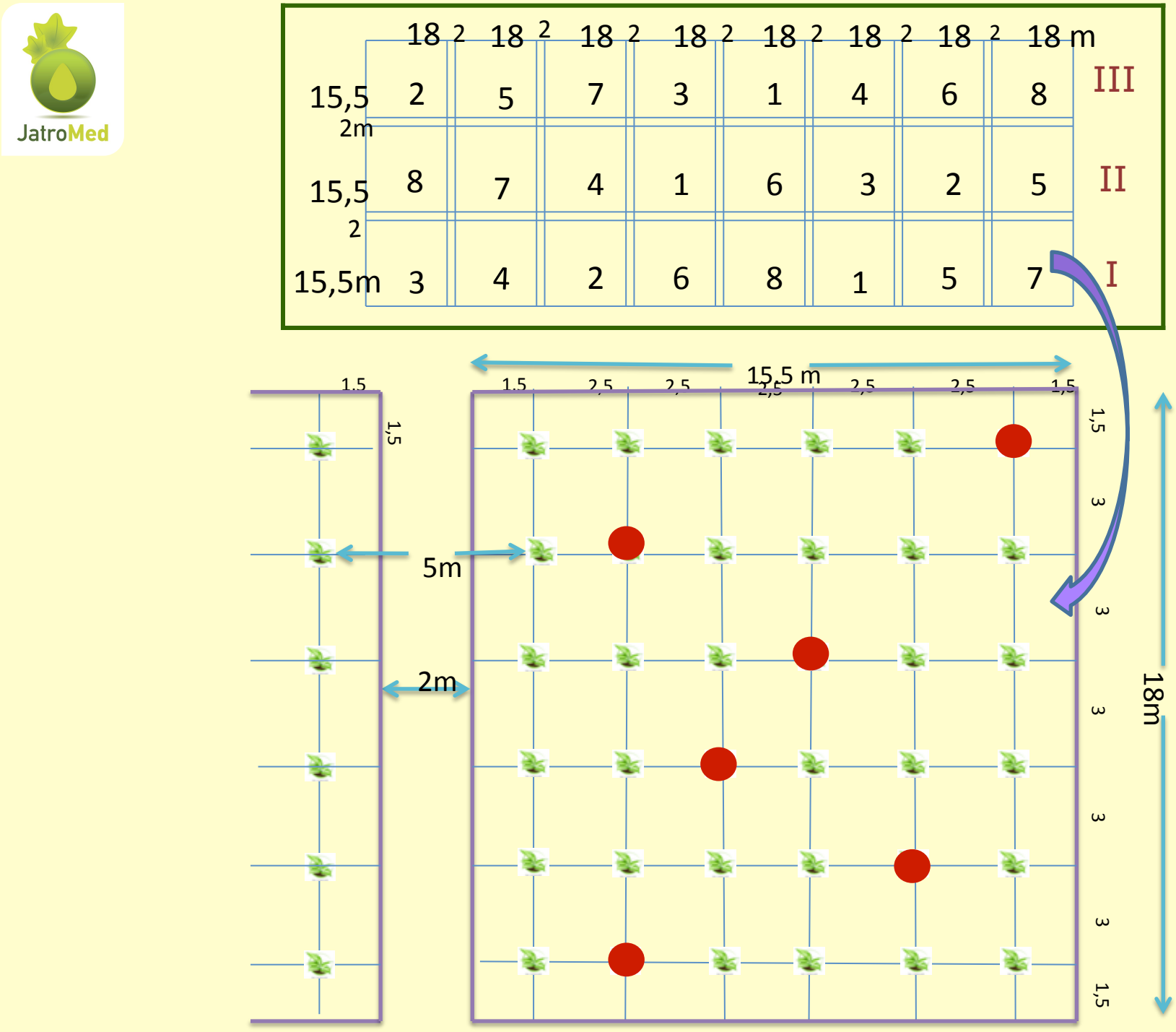
Valve

Tank with fertiliser

Plot

Drippers 4lit/hour

2 drippers per plant


18 2 18 2 18 2 18 2 18 2 18 2 18 2 18 m
15,5
2m
15,5
2
15,5m
2 5 7 3 1 4 6 8
III
8 7 4 1 6 3 2 5
II
3 4 2 6 8 1 5 7
I
15,5 m
1,5
1,5 2,5 2,5 2,5 2,5 2,5 1,5
1,5
3
3
3
3
3
1,5
5m
2m
18m

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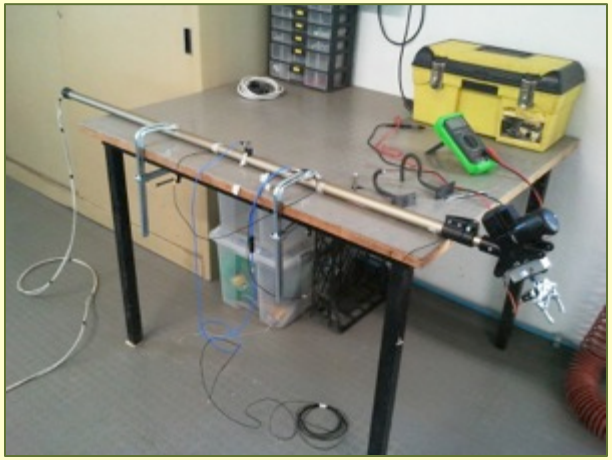
Data taken in the field

Number of plants per genotype in the field
Plant height (from the 6 plants/plot)
Trunk diameter (at collar, near the soil) + (from the 6 plants/plot)
Number of branches (from the 6 plants/plot)
Date when the plants start to lose their leaves
Date of emerging new leaves
Number of inflorescences per plant (from the 6 plants/plot)
Number of flowers per inflorescence (from the 6 plants/plot)
Number of female flowers per inflorescence (from 6 plants/plot)
Number of male flowers per inflorescence (from the 6 plants/plot
Number of female-male ratio per inflorescence
Time of flowering (date of appearance of the first flower)
Time of flowering end (date of appearance of the last flower)
Time of fructification (date of appearance of the first fruits)
Number of fruits per inflorescence (from the 6 plants/plot)
Size of fruits (from the 6 plants/plot)
Time of ripening (when the color from yellow start to be brown)
Number of fruits (for all plants)

Data taken in the laboratory
Production per genotype (number of fruits and seeds per year)
Production per plant (number of fruits and seeds per year)
Seed size and weight
Husk weight
Dry matter distribution ratio between husk and seeds
Weight of produced seedcake
Oil content in seeds
Water quantity used per year
Water use efficiency (seed weight/water quantity)
Quantity of used fertilizers per year
Seed weight/quantity of used fertilizers

Activity 4 : MECHANICAL HARVEST



Activity 5 : ECONOMIC AND ENVIRONMENTAL ANALYSIS

Main goals:

✓Analyze the costs of jatropha cultivation

✓Compare the costs of jatropha in the three demo fields (Egypt, Morocco, Algeria)

✓Implement an environmental-energy analysis of the jatropha production process

Software package for the analysis of costs of investment projects in agriculture
(http://www.abc.aua.gr/)

abc software
the advanced abc solution

Laboratory of Agribusiness Management
Agricultural University of Athens

A/A	Country	Genotypes	Treatments
1	Egypt	Michoacan	A1B1
2			A2B1
3			A1B2
4			A2B2
5		JCLMax 3.0	A1B1
6			A2B1
7			A1B2
8			A2B2
9		GHS-B	A1B1
10			A2B1
11			A1B2
12			A2B2
13		JAT106	A1B1
14			A2B1
15			A1B2
16			A2B2

A/A	Country	Genotypes	Treatments
17	Morocco	Michoacan	A1B1
18			A2B1
19			A1B2
20			A2B2
21		JCLMax 3.0	A1B1
22			A2B1
23			A1B2
24			A2B2
25		QVP 3014	A1B1
26			A2B1
27			A1B2
28			A2B2
29		Mali	A1B1
30			A2B1
31			A1B2
32			A2B2

A/A	Country	Genotypes	Treatments
33	Algeria	Michoacan	A1B1
34			A2B1
35			A1B2
36			A2B2
37		JCLMax 3.0	A1B1
38			A2B1
39			A1B2
40			A2B2
41		Veracruz	A1B1
42			A2B1
43			A1B2
44			A2B2
45		GHN-D	A1B1
46			A2B1
47			A1B2
48			A2B2

ABC simulation platform. Cost analysis scenarios per country - all genotypes and treatments considered

The activities considered for the economic analysis are:

1. Sowing seeds in nurseries
2. Field preparation
3. Transplantation
4. Fertilization
5. Irrigation
6. Pest control
7. Weeding
8. Pruning
9. Harvesting
10. Preparation of harvested fruits and possible storage
11. Transportation of seeds to oil extraction
12. Oil extraction

Activity needs:

- ✓Labour
- ✓Machinery (tractors, pumps, etc.)
- ✓Energy (fuel, electricity, etc.)
- ✓Raw material (seeds, fertilizer, etc.)

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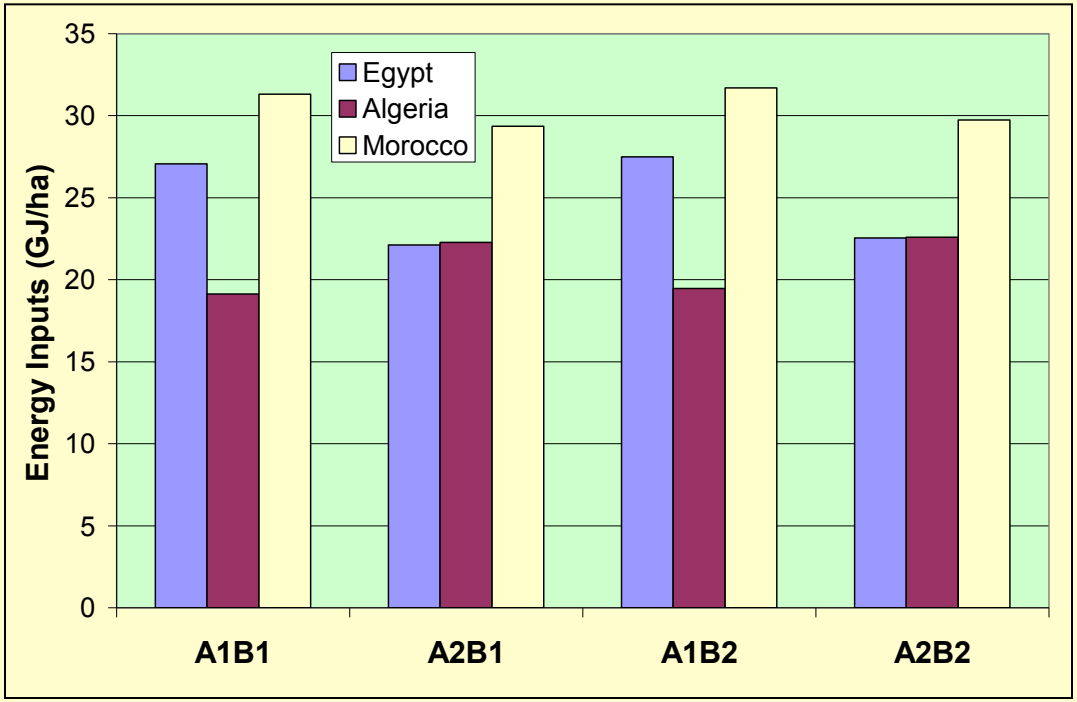
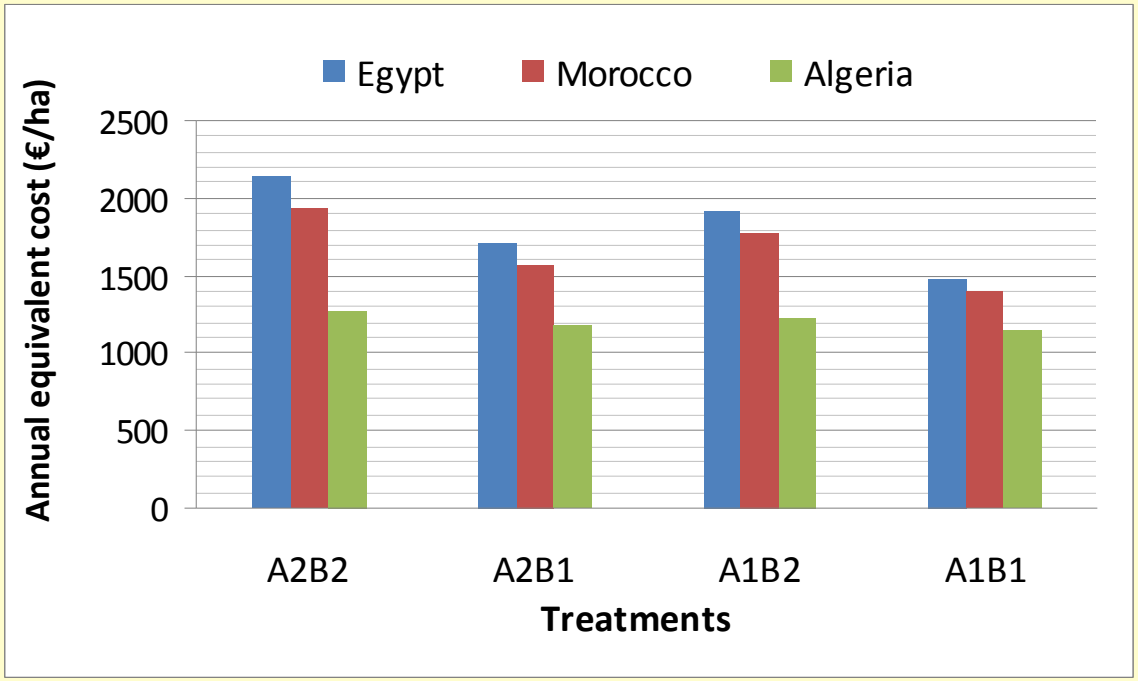
Treatments:

- ***A1/A2: low/high fertilization***
- ***B1/B2: low/high irrigation***





Activity 6 : DISSEMINATION and EXPLOITATION OF RESULTS

- ✓Website (www.jatromed.aua.gr)
- ✓Social media (https://www.facebook.com/Jatromed?ref=hl)
- ✓Two newsletters released
- ✓10 publications in International Conferences
- ✓Meetings with farmers, local population, politicians, stakeholders
- ✓Field visits by farmers and stakeholders
- ✓Knowledge transfer events

Knowledge transfer events

EGYPT

MOROCCO

ALGERIA

THANK YOU FOR YOUR ATTENTION

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Acknowledgement

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