MOUNTAIN HER

WP3: Resilient agroecological solutions for circular economy

Task 3.1 *On farm assessment of best bet practices for resilience - first activity report*

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PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

TASK 3.1 On farm assessment of best bet practices for resilience

'Evaluation des performances économiques des pratiques agro -écologies en comparaison avec les pratiques conventionnelles'

Any innovation implemented in a given territory generates costs and benefits. An innovation is only profitable if the total benefits are greater than the total costs. It is the very principle of cost-benefit analysis (CBA) to compare all the costs and benefits of an innovation to assess its economic profitability.

Thus, the use of CBA in the activity (TASK 3.1) aims to provide a quantitative analysis with the aim of guiding farmers in making future decisions to adopt and invest in innovation. Cost-benefit analysis (CBA) provides an economic justification for the choice of innovation. It is a quantitative, evidence-based method that makes it possible to evaluate the impact of interventions.

Therefore, the cost-benefit analysis was carried out using a comparative approach of Agro-Ecological (AE) practices with the conventional system, to highlight the economic effects of AE. To this end, the costs generated by the various cultural operations and the income were quantified using a technical sheet valued on the technical route practiced by farmers in AE, and farmers in conventional agriculture.

Surveys were conducted among all partners (Algeria, Croatia, Italy, Lebanon, Morocco and Tunisia), on a sample of farmers practicing conventional agriculture and a sample of farmers practicing AE for first time as part of the MountainHER project. Conventional practices are those adopted by farmers without making any modifications, on the other hand agro-ecological practices are proposed by the project team and contain new practices which are indicated in the table below:

countries	Agro ecological practices
Algeria	✓ False seeding using Cover crop ✓ Spreading of organic fertilizer such as Compost 4.4.4 at a rate of 1 ton/ha ✓ harrowing before sowing, ✓ Sowing using the experimental seeder at a density of 300 seeds/m2 ✓ Spraying with vermicopost at a rate of 30 l/ha at the beginning of tillering stage. ✓ No application of phytosanitary treatment
Croatia	✓ Pelletized manure ✓ Organic fertilizer (25 kg) ✓ manual Sowing and harvest
Italy	✓ Biochar mixed with manure in the plots not managed by the farmer; ✓ Intercropping with Clover repens (CV Huja) (leguminous plant that is not very competitive in early stages of development)

Lebanon	✓ Targeted NPK, ✓ Minimum land preparation (5 rails plowing), ✓ Rotation with legumes, ✓ Control of the nitrogen dose (59% reduction) ✓ Manual weeding
Morocco	✓ No till ✓ Deep fertilizer(20 kg/ha N and 60 P and 20 K) ✓ Seed driller (Zurn D83) 80 kg/ha barley and 100 kg/ha durum wheat) ✓ Split N cover fertilization (20 units/ha at tillage and 20 Units/ha at heading stage) ✓ Inter-croppings with common vetch ✓ Manual harvest
Tunisia	✓ No till ✓ Targeted NPK

Table : Agro ecological practices for each partner

Results and discussion

Rain shortage and drought recorded during the 2022-2023 season of the project affected cereal yields in both systems; moreover, the small size of the sample surveyed this year does not give accurate and representative results, but still remain interesting in terms of comparison between the two systems and can guide few insights on the economic impact of each practice in different contexts as well as in the coming years of the project.

1. **Algeria:**

According to the table below, the analysis of the Cost-benefit data per hectare of the two systems shows that the inputs are more important for agro-ecological practices 697.73 € compared to conventional practices 419.53 € for durum wheat, a difference of 278.21 €. The increase in inputs of agro-ecological (AE) practices is explained by the high cost of Bio-fertilizers which represents 56.6% of the total input.

The same observation was recorded for durum wheat income, the best income was obtained by conventional practices, which is estimated at 723.40 € and 585.67 € for agro-ecological (AE) practices, i.e. a difference 137,73 €. Thus, the best benefit-cost ratio is obtained with conventional practices, i.e. 1.7 compared to 0.8 with agro-ecological practices. For its first year of testing agro-ecological practices, the results obtained obliged the Algerian partner to revisit the best choice of agro-ecological package tested and offered to farmers. Especially since the benefit-cost ratio index only allows projects to be accepted with a benefit-cost ratio equal to or greater than one.

		Farmer practice	AE practices
Durum wheat	Total Input (€)	419,53	697,73
	Total revenue (€)	723,40	585,67
	Benefit-cost ratio	**1,7**	**0.8**
Barely	Total Input (€)	304,38	
	Total revenue (€)	505,60	
	Benefit-cost ratio	**1,7**	

Table : Benefit-cost analysis of agro-ecological practices using partial budget analysis – Algeria-

2. Morocco:

The results in the table below show that the total input of durum wheat agro-ecological practices are very low (195.66 €) compared to conventional practices (2891.32 €), a difference of 2695.66 €. The inputs of agro-ecological practices represent 7% of conventional practices.

The same observation was recorded for the total income from durum wheat, the total income from conventional practices is higher by 7,174.74 € or 85% of the total income from agro-ecological practices. However, the benefit – cost ratio is higher for agroecological practices (6.4) compared to (2.9) for conventional practices.

Concerning barley, the same results were obtained, the total input of conventional practices is greater than the total input of agro-ecological practices of 2157.91 € or 92%

The total income from conventional practices is higher than the total income from conventional practices, a difference of 5,212.31 €. However, the best benefit-cost ratio was obtained with agro-ecological practices (4.7) compared to (2.6) of the benefit-cost ratio of conventional practices.

In conclusion, the package of agroecological practices tested deserves to be adopted and disseminated among farmers.

		Farmer practices	**AE practices**
DurumWheat	Total Input (€)	2891,32	195,66
	Total Revenue (€)	8430,60	1255,87
	Benefit-cost ratio	**2,9**	**6,4**
Barely	Total Input (€)	2353,57	195,66
	Total Revenue (€)	6138,28	925,97
	Benefit-cost ratio	**2,6**	**4,7**

Table: Benefit-cost analysis of agro-ecological practices using partial budget analysis – -

Morocco

3. Italy:

According to the table below, the results show that the costs per hectare of agro-ecological practices are higher than the costs per hectare of farmers' practices, a difference of 100.8 €.

For both species (wheat, barley).? Unlike the total income, the highest income with agro-ecological practices is 152 € for wheat and 110.6 € for barley compared to 132 € and 98 € respectively.

However, it should be noted that the total income from the two practices is very low, this is due to the low yields obtained during the 2022-2023 agricultural season which is 2 q/ha for farmers' practices and 2.3 q/ha for agro-ecological practices, following the poor climatic conditions of the countryside. This resulted in a benefit-cost ratio of less than one for both practices. The results obtained during the 2022-2023 season cannot be taken into consideration.

		Farmer practices	**AE practices**
Wheat	Total Input (€)	981.5	1082.3
	Total Revenue (€)	132	152
	Benefit-cost ratio	**0.13**	**0.14**
Barely	Total Input (€)	976.5	1077.3
	Total Revenue (€)	98	110.6
	Benefit-cost ratio	**0.10**	**0.10**

Table: Benefit-cost analysis of agro-ecological practices using partial budget analysis – - Italy

4. Lebanon :

According to the table below, the analysis of the cost-benefit data per hectare of the two systems shows that the inputs are more important for agro-ecological practices (1971.88 €) compared to conventional practices (1352.80 €) for low input durum wheat, a difference of 619.08 €. The increase in the inputs of agro-ecological (AE) practices is explained by the high cost generated by the sowing operation and manual weeding, which represent 46.5% of the total input.

Same observation was recorded for durum wheat income, the best income was obtained by AE practices, which is estimated at 1903.10 € and 1141.86 € for farmer practices, a difference of 761.24 €. Thus, the best benefit-cost ratio is obtained with AE practices, i.e. 0.96 compared to 0.84 with farmer practices. For its first year of testing agro-ecological practices, the results obtained give us pause for thought on the best choice of agro-ecological package tested and offered to farmers. Especially since the benefit-cost ratio index only allows us to accept practices with a benefit-cost ratio equal to or greater than one.

		Farmer practice	AE practices
Durum wheat	Total Input (€) - in low input	1352,80	1971,88
	Total revenue (€) - in low input	1141,86	1903,10
	Benefit-cost ratio - in low input	**0,84**	**0,96**
	Total Input (€) - in high input	3118,33	
	Total revenue (€)-in high input	3044,95	
	Benefit-cost ratio -in high input	**0,98**	

Table : Benefit-cost analysis of agro-ecological practices using partial budget analysis – Lebanon -

5. Croatia and Tunisia

For the case of Croatia, the size of the sample to be conducted is not sufficient to represent the feasibility of the practices adopted (farmer and AE practices); Moreover, despite the promising results of the first yearin terms of development of varieties under AE, the results obtained do not allow us to judge the economic profitability of the practices since the work was carried out on an experimental scale, and the investigation must be carried out in the second year with a larger sample.

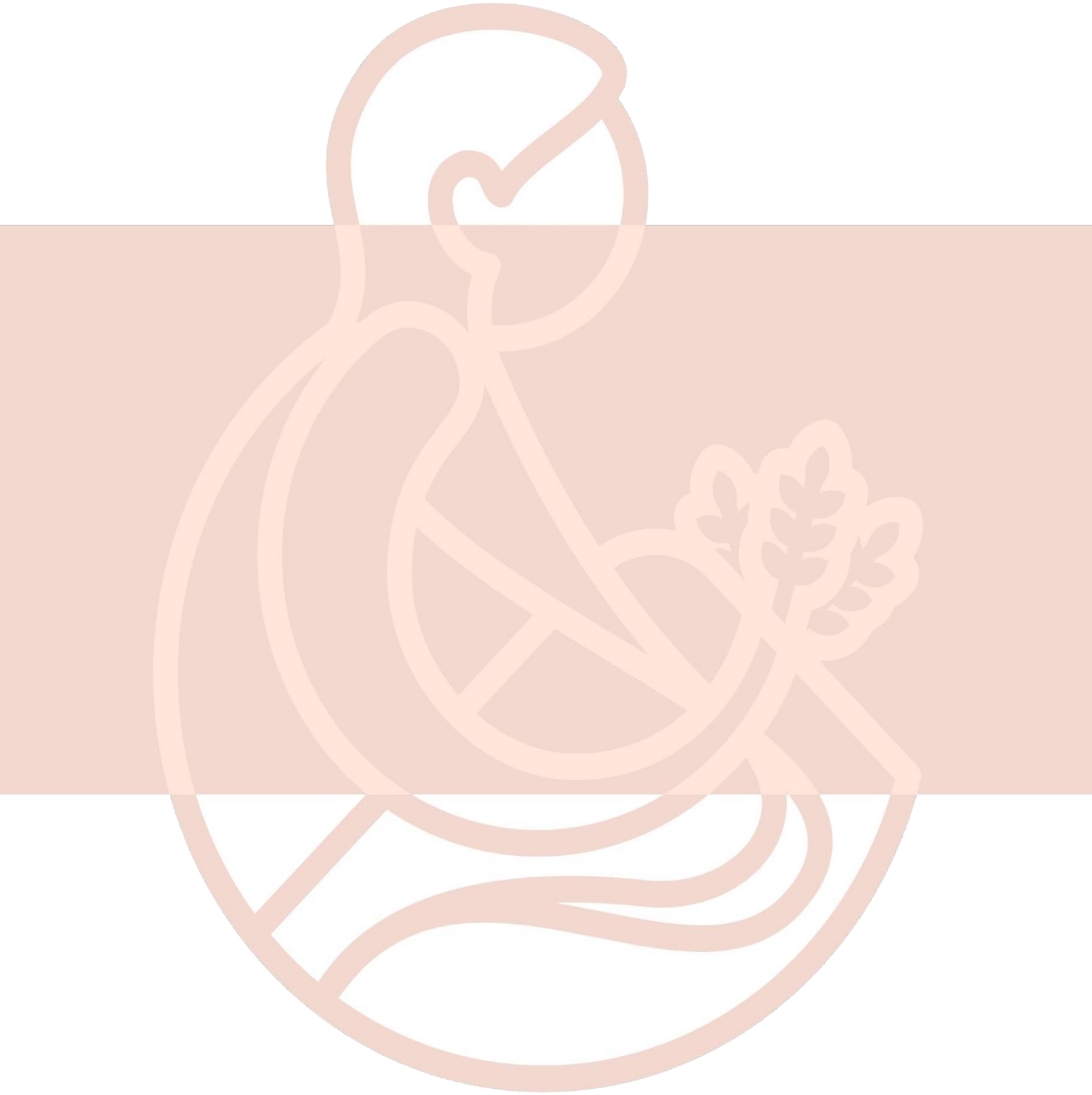
For the case of Tunisia, several practices were tested, but the drought did not make it possible to obtain production to compare the feasibility and effectiveness of each system, which will require the renewal of the survey for the second year.

Conclusion:

The analysis of the cost benefit of AE and farmer practices carried out among the partners within our project showed that there is a major impact related to the choice of practice and the income from each practice, Results obtained from one year do not allow us to validate the effectiveness of each system with selected AE practices, but they give us an overview of the impact of practices and the need to make economically profitable choices for better adoption of practices by farmers in the coming season.

MOUNTAIN HER

Empowering women in mountain farming communities



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