

FACT SHEET

Permaculture Design and Business Plan for Sustainable Livelihoods Programming: Low-Cost, Sustainable Solutions for Food and Nutrition Insecure Agro Pastoral Communities:

Permaculture as a development tool to managing dry land resources

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Wicking beds systems in Al Majidyya (Credit: Socio-economic Team - NARC – Jordan)

Understanding the Context

There is a serious threat posed to human survival by food insecurity, especially among vulnerable communities such as agropastoral living in dry land areas. The overwhelming effects of the land degradation, low productivity, and food insecurity in the agropastoral farming systems have again called attention to the need for a longer-term response to the problems of food security and rural development in the agropastoral dry areas. Evidenced climate change threats, water scarcity, and resources degradations are the main factors that have exacerbated these problems. They will continue to do so until more sustainable responses are in place. Solving these problems will require an integrated approach that encompasses the main themes of this volume. These include managing productive resources throughout the climate change threats, understanding ways to promote change, and managing dryland resources. There is considerable accumulated experience on options to help tackle these problems.

One development approach that shows promise for agropastoral farming systems communities programming, particularly in a dryland context, is permaculture. Therefore in the frame of the *Strengthening Innovation and Technology Adoption towards Sustainable Agricultural Productivity in Arab Countries* project and under the diversification of agropastoral system-based value chains activity, the *International Center for Agricultural Research in the Dry Areas (ICARDA)* in collaboration with the *National Agricultural Research Center (NARC - Jordan)* designed and implemented this technique in the agropastoral region of Jordanian Badia (i.e., Al Majidyya).

What Does this Fact Sheet Outline?

This fact sheet provides an overview of permaculture programming as a response to food and nutrition insecurity for agropastoral communities. It emphasizes the role of permaculture as a sustainable, non-donor dependent tool for improving the health, food and nutrition security, and livelihoods of agropastoral communities and their families. This document explain why permaculture is relevant to agropastoral communities programming, particularly in the context of climate change threats, and list some of its benefits with special focus on delineating the costs of integrating permaculture into agropastoral communities towards a comprehensive business plan regarding the implementation of this technique and to provide an overview of its programming as a response to food and nutrition insecurity for agropastoral communities. This synthesis is not intended to offer an exhaustive review of permaculture's methodology. Instead, it serves as an introduction to its principles, and provides initial guidance and examples on how it can be used to benefit agropastoral communities and their families. The geographic focus of this brief are agropastoral farming systems with high drought, land degradation (natural resources depletion).

What is Permaculture: Context in the Agro Pastoral Farming Systems

The concept of "permaculture" is a type of agriculture system which has been designed and implemented one year ago in Al Majidyya (Jordanian *Badia*) following a logical based process to make the system more sustainable in this agropastoral area. The aim of this experiment "permaculture" in this agropastoral farming system was to restore soil, conserve water, and redirect waste streams. At the end, its principle is to make a crop production system by considering the function of each plant and the interaction between plants in which the components inside are mutually beneficial to each other in this specific agropastoral context. There are many techniques through the project with available inputs in order to enhance food security and water saving to improve livelihoods through increasing income and give farmers' self-sufficiency through home manufacturing of farms food products. These techniques summarized in, water harvesting techniques (WHT) (rooftop water harvesting, swale, and water pond), compost manufacturing, wicking beds systems cell raising system for sheep, food forest, azolla, barley and chickens' tractors systems which will lead to generate Income. The elaboration of a business model for permaculture farming system in a selected household in Al Majidyya village (Jordan) will allow for sound conclusions on whether the permaculture model can be used to bring food security to the agro-pastoral communities. This business model analysis was based on the following concepts:

- Making efficient dry land resources
- Make use of diversity
- Encourage multifunctionality
- See solutions no problems (challenges) in the agro-pastoral farming systems and communities

From Theory to Practice: Applying the Permaculture Design Process in the Agro Pastoral Farming Systems in Al Majidyya (Jordan)

Adopting permaculture in agro-pastoral farming systems can turn the agropastoral communities resilient and the farming system sustainable. To understand if the permaculture model can be implemented alongside agropastoral communities as a sustainable solution to food insecurity and how can the permaculture model be replicated to other arid areas in the dryland areas, it is worth to mention that permaculture introduced new technologies and increased farmers' performance to their lands and recourse to improve soil properties and increase productivity in the agropastoral community of Jordan (i.e. *Badia*). These projects techniques summarized in, Water Harvesting Techniques (WHT), compost manufacturing and Income generation systems (Wicking beds systems, chickens' tractors, cell raising system for sheep, food forest, azolla, barley swale, water ponds, and compost manufacturing). A detailed description on the design process and the permaculture project undertaken in this research study, please see Dhehibi and Al Hiary (2020a, 2020b) and AL Hiary et al., (2021).

What Does Permaculture Cost in Al Majidyya?

Business plan indicators

The assessment of the financial and economic indicator of this business reveal its profitability of investment under a discount rate of 3% and 6%, respectively. The group of economic factors outlined in the table below suggest an average net profit for about 5753.33 JD/year. In addition, we calculated indicators under a non-discounted profitability criterion such as profitability index (PI), known as Profit Investment Ratio (PIR), payback period (PB), and return on investment (ROI), of this project under the two discount rates. The profitability index rule is a decision-making exercise that helps evaluate whether to proceed with this permaculture project. Given the rule is that a profitability index or ratio greater than 1 indicates that the project should proceed. A profitability index or ratio below 1 indicates that the project should be abandoned. PI indicator shows a ratio greater than 1 under both scenarios. This allows to confirm the profitability of this project. The second indicator is the payback period. This indicator refers to the amount of time it takes to recover the cost of an investment. Under both scenarios, the payback period length of time an investment reaches a break-even point after 2 and 2.1 years, respectively. Thus, the desirability of an investment is directly related to its payback period. In our case, therefore, shorter paybacks mean more attractive investments. The return on investment indicator, this financial metric used to measure the amount of return on a particular investment, relative to the investment's costs, is greater than one suggesting a gain from this investment in permaculture business relative to its costs, and consequently the profitability of this investment. This statement is also confirmed by the discounted profitability indicators (CBR and IRR). Overall, the permaculture in this agropastoral community could be saving money business for the next 10 years, making evidence for its profitability and self-sustainability.

Table 1. Economic and financial indicators – Permaculture business plan in Al Majidyya (Jordanian *Badia*)

Item	Indicators	@Discount Rate 3%	@Discount Rate 6%
Non-discounted profitability criteria	Average Net Profit (JD)	5753.33	5753.33
	Profitability Index (PI) (1 + (Net Present value / Initial investment))	13.22	10.97
	Payback Period (Years)	2	2.1
	Return on Investment (ROI)	1.51	1.51
	Break-Even Analysis (Return on sales per dinar invested)	0.2	0.2
Discounted profitability criteria	Net Present Value (JD)	45964.07	37492.37
	Benefit Cost Ratio (BCR)	1.38	1.16
	IRR (%)	89	84

Source: Project team elaboration based on Amman market price (2020).

Note: (1) Area of the permaculture investment: 4 dunums (0.4 hectares); (2) 1 JD=1.41 US\$.

Potential risks

Given the fact that we are dealing with an investment, it is worth to assess the potential risks associated with this type of investment. Overall, risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return by investing in permaculture. Risk includes the possibility of losing some or all of an original investment. Quantifiably, risk is usually assessed by considering several types of risks. Risk takes on many forms but is broadly categorized as the chance an outcome or investment's actual gain will differ from the expected outcome or return. In this type of investment, four types of risk and several ways to quantify risk for analytical assessments are considered.

Financial risk: Financial risks are considered low because permaculture techniques require use and recycle available simple tools in the farm. If they do not exist, their costs are not expensive.

Operational risk: Operational risks are low, as agricultural supplies and agricultural services are provided in addition to the availability of expertise and labor.

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Market risk: Market risks is low due to agricultural diversification intensified towards fruits and vegetables production.

Physical risk: Physical risks (weather, diseases) are moderate in vegetable production constrained by pests and diseases which effects are exacerbated by climate change and variability.

Overall, it is possible and prudent to manage investing risks by understanding the basics of risk, how it is measured, and what strategies and procedures that could take to reduce or mitigate these potential risks in the permaculture business plan. Learning the risks that can apply to different scenarios and some of the ways to manage them holistically will help all types of investors and business managers (i.e., dryland farmers) to avoid unnecessary and costly losses.

Sustainability plan

The permaculture principles based on mimicking the patterns and adaptive nature of an ecosystem. Permaculture brings together elements of tried and tested approaches and technologies to the design and development of sustainable systems. The principle of this concept is a framework that works toward sustainability of livelihoods farming systems. The main benefits of permaculture were identified as improved farmers livelihoods, human health, increased resilience to environmental changes, and reduction of input costs. It maximizes the use of local resources, applying ecological principles to meet human needs for food, shelter, energy, and a sense of community. Permaculture integration with other forms of sustainable agricultural practices can contribute to improved rural livelihoods. It emphasizes sustainable and regenerative agriculture practices and seeks to sustain both people and nature. To be sustainable, there is an emphasis on low input strategies that implementers can replicate using their own resources, without the need for outside funding. Farmer can have a great positive impact by performing the various agricultural operations that make the agricultural environment more suitable for the growth and development of permaculture techniques, or through the intervention of improved varieties with high productivity, good quality and disease resistance.

Running this permaculture business is all about forming a vision, a good understanding of this farming concept, creatively utilizing dryland resources, financial planning and entrepreneurship. Permaculture farming is especially complex because it requires both entrepreneurial skills and all the hard-physical work involved specially in this arid environment. Therefore, to have the business sustainable, here are some key elements to be considered:

- Having a good design and install working landscapes: Planning is critical
- Keeping the expenses low and having a savings buffer
- Starting with a basic business plan in which including a simple marketing strategy
- Investing in knowledge and skills linked to this technique and building partnership with other farmers, organizations, private sector, etc.

Concluding Remarks and Implications

Permaculture can be effective in supporting multiple objectives in the agropastoral farming systems. As revealed in this study, permaculture could be a promising concept that may help support livelihood activities and improve the ability of agropastoral farmers to deal with environmental problems (land degradation, water scarcity, climate change, etc.) in the dryland areas. The study suggests also that permaculture holds the key to increasing dietary diversity within households and enhancing social and ecological resilience.

The elaboration of a business model for permaculture farming system in a selected household in Al Majidyya village (Jordan) reveal the potential profitability of investing in this technique in the dry land areas. This implies a transition from conventional production system in agropastoral towards an array of sustainable regenerative production systems that improve productivity with limited resources. Furthermore, shifting from the current approach in agricultural management in these farming systems is necessary. An approach that acknowledges the role of people as not mere producers of food, but also as managers of ecological systems that produce a suite of ecosystem services is needed.

Although this is the first attempt to assess this concept in the Jordanian agropastoral system, we can assure that findings from this study are valuable for Jordanian decision-makers in their roles to promote the permaculture business in the dryland areas. However, these findings, perhaps a necessary step to argue on the profitability evidence that permaculture could be a sustainable solution to both protect the environment and ensure food security for farmers in these areas, there is need to ensure that these improved methods are tailored to suit the agropastoral ecosystems through more research for development (R4D).

A necessary step for this will require institutional support that favorize management of dryland productive resources in the frame of the climate change threats by understanding ways to promote change, ensuring smooth transitions across all stages of food systems, which includes improving the resilience of agropastoral communities' livelihoods. With a considerable accumulated experience on options to help tackle these problems (i.e., permaculture), a space for knowledge exchange on sustainable agricultural practices, coupled with a supporting environment and strong governance are also vital. This entails a strong emphasis on alternative agricultural practices in national strategies. Finally, increasing allocated funds to support research and development for such transitions model will be required from community to national levels in order to advance socio-economic development in these less favored areas.

Box 1. Key highlights

- Permaculture is a potential development tool for managing dry land resources that shows promise for agropastoral farming systems communities programming.
- Permaculture is a low cost and profitable sustainable solution for food and nutrition insecure agropastoral communities.
- Permaculture is relevant technology to the agropastoral farming systems communities.
- The benefits associated with permaculture from economic return is increased savings from reduced input, high yields, and affordability of this technique.

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