Promoting Green Entrepreneurship: Connecting the Jordan Valley to Green Composting
Table of Contents

Enterprise Development for Women and Youth in the Jordan Valley......... 3
Promoting Green Composting in the Jordan Valley................................. 4
The Process ................................................................................................. 6
Lessons Learned .......................................................................................... 16
Conclusion .................................................................................................... 19

Acknowledgments

<table>
<thead>
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</thead>
<tbody>
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</tbody>
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JVL is made possible with the generous support of Global Affairs Canada and is implemented by Mennonite Economic Development Associates (MEDA).

Thanks to JVL’s many partners – both Key Facilitating and Private Sector Partners – and MEDA’s generous private supporters.

Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tr>
<td>FPEC</td>
<td>Future Pioneers for Empowering Communities</td>
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<tr>
<td>GAC</td>
<td>Global Affairs Canada</td>
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<tr>
<td>GNC</td>
<td>Ghor Al-Naq’e Cooperative</td>
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<td>JVL</td>
<td>Jordan Valley Links</td>
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<td>MEDA</td>
<td>Mennonite Economic Development Associates</td>
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</table>

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Enterprise Development for Women and Youth in the Jordan Valley

MEDA’s Jordan Valley Links Project (JVL) is working with civil society and private sector partners to economically empower 25,000 women and youth in the Jordan Valley and increase their contribution to Jordan’s economic growth. Women and youth are supported with training and mentorship to improve their business acumen and are linked to markets where they can sell their products and services. The project works in three sectors: food processing, community-based tourism, and clean technologies. To increase access to finance, the project brings together Savings and Loans Groups, which are self-replicating, member-driven groups that meet regularly to save small amounts of cash which can be lent to members. JVL is building support for entrepreneurship in families and communities through role models, gender dialogues, and communication campaigns to promote the value of self-employment for women and youth.

JVL Learning Series

The JVL learning series is an ongoing initiative to share lessons learned as the project is being implemented. Topics include private sector engagement in Jordan, client experiences with savings and loan groups, effective strategies for enterprise development and measuring women’s economic empowerment.

![Figure 1: Overview of the Jordan Valley Links project](image)

Improving incomes and livelihoods for women and youth
Promoting Green Composting in the Jordan Valley

The Problem:
The Jordan Valley is considered the country’s food basket, able to support various kinds of cultivation. The intensive agricultural practices in the area, however, contribute to the production of thousands of tons of green waste on an annual basis. Management of this green waste is an ongoing challenge, with most of it currently transferred to dump sites or used as livestock feed. To promote crop growth, farmers heavily use pesticides, herbicides, inorganic fertilizers, and raw animal manure. Extended use of these additives results in the deterioration of the soil quality, structure and integrity. This in turns affects the quality and quantity of agricultural production, as well as causing a severe fly problem that is affecting the health of local inhabitants and impeding economic potential in the tourism sector.

Green waste is any biological waste or organic waste that can be composted. In the Jordan Valley, this mostly comprises waste from agricultural activity such as excess vegetables/produce, green leaves, and grass. Green waste contains high concentrations of nitrogen and does not include things such as dried leaves or hay, also known as ‘brown waste’, which are rich in carbon.

The Solution:
Composting is a green waste management solution that will have positive impacts on both the environmental and socio-economic fronts. Composting is a process by which organic materials, otherwise regarded as waste products, are recycled into simpler organic and inorganic compounds. Compost is an important resource for agriculture since it helps to recycle organic materials, reduces waste, replenishes depleted soils, and improves soil health. Green composting enriches soil with nutrients, helps to retain moisture, improves soil structure, and suppresses plant diseases and pests. It also reduces the need for chemical fertilizers and encourages the reduction of methane emissions from landfills – all of which lowers the carbon footprint.

1 https://en.wikipedia.org/wiki/Green_waste
2 https://jordantimes.com/opinion/walid-m-sadi/important-yet-neglected
Test and create a solution for women working in agriculture that not only benefits the environment and manages waste, but also changes agricultural practices and creates a potential new source of income. The JVL team supported women entrepreneurs to pilot a green composting enterprise which could address existing market and agricultural conditions, including the large amounts of green waste already generated in the Jordan Valley and the financial costs associated with disposal of this waste. If successful, the JVL solution would result in several inter-connected benefits:

- Take advantage of existing volumes of green waste
- Minimize the cost to communities and municipality of transferring and dumping waste
- Create an alternative to and ultimately replacement for chemical fertilizers
- Resolve environmental issues
- Contribute to socio-economic enhancement
- Minimize breeding of pest species

### Why not manure?

Although both manure and green compost are organic solutions for agricultural production, they have different benefits. The table below presents a comparison between green compost versus manure:

<table>
<thead>
<tr>
<th></th>
<th>Green compost</th>
<th>Manure</th>
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<tr>
<td><strong>Pros</strong></td>
<td>Feeds the soil</td>
<td>Increases nutrients in the soil</td>
</tr>
<tr>
<td></td>
<td>Better moisture retention</td>
<td>Can be added to compost</td>
</tr>
<tr>
<td></td>
<td>Builds disease resistance</td>
<td>Helps prevent nutrient leech^4</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Expensive to purchase (compared to manure)</td>
<td>Fresh manure can attract pests, negatively affecting the environment</td>
</tr>
<tr>
<td></td>
<td>May be odorous</td>
<td>Large quantities of manure can contain parasites</td>
</tr>
<tr>
<td></td>
<td>Proper creation takes time</td>
<td>Medicines (e.g., antibiotics) and chemicals from treated animals can remain in manure^5</td>
</tr>
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</table>

^3 Source: https://www.backyardboss.net/compost-vs-manure/
^4 Leaching is the process by which water-soluble plant nutrients are lost from the soil, due to rain and irrigation. Fertilizers are one agricultural practice to avoid or reverse this process, helping to maintain soil structure.
^5 https://www.backyardboss.net/compost-vs-manure/
The Process

This section outlines the process and individual steps taken to initiate and execute the JVL pilot solution to green composting in the Jordan Valley.

Step 1: Identify Partners and Initiate Process

MEDA has been working with a Clean Technology Consortium led by the Royal Scientific Society/ National Energy Research Center (RSS/NERC) in partnership with Greentech and Future Pioneers for Empowering Communities (FPEC) in two areas – clean technology and agriculture. Based on the training that was conducted by FPEC, the idea of establishing a composting facility was generated in partnership with Ghor Naqee Cooperative (GNC), since its members were already heavily involved in agriculture, had access to land to do the composting, and had demonstrated interest in and commitment to undertaking such a business following their waste composting training. A strong community-based organization consisting of 15 women already committed to composting, the GNC shared the same vision and objectives with JVL and FPEC to increase technical capacities and expand sources of income for all.
Once FPEC and GNC were identified and on board, an extensive consultation process was conducted with relevant municipality representatives, as well as with the Agriculture Department of Al-Aghawar Al-Janwbieh. Consultations with the Ministry of Environment in Amman were also undertaken to understand the legal obligations and technical issues to be considered before initiating the proposed business model. These consultations were critical to obtain official support for the pilot and begin implementation. At the same time, review and analysis of similar interventions was conducted by FPEC and MEDA to understand and identify success factors, lessons learned and possible gaps or challenges. For example, FPEC and MEDA visited a composting facility managed by Karak Municipality, which was established with funding from the German Federal Government through its international cooperation arm, the German Agency for International Cooperation (GIZ).

Following these consultations, FPEC hired a technical expert to work with members of the GNC to build their knowledge and provide training on topics such as: the definition of green composting and its advantages; the disadvantages of using chemical animal (poultry) fertilizers; nitrogen versus carbon ratio calculations; and how to manually determine humidity rates and temperatures during the composting process.

All this work informed FPEC’s development of a business proposal and detailed budget for green composting, which was then submitted to the JVL project for funding. The proposal also laid out a clear process with roles and responsibilities of all stakeholders involved. Once approved, initiation of the microenterprise moved forward.
Promoting Green Entrepreneurship: Connecting the Jordan Valley to Green Composting
Step 2: Land Preparation and Green Waste Collection

Land preparation was the most immediate next step. FPEC initially rented half an acre of land belonging to one of the GNC members. The land was well situated – close to farming areas, accessible to a main road, and had a continuous water supply. To use the land for composting, the GNC (which was setting up the microenterprise) had to follow several procedures dictated by the Government of Jordan. The sequence of procedures followed is summarized below to provide both an overview and an indication of the bureaucratic processes involved in initiating a composting microenterprise. Navigating this process is difficult for microenterprises, particularly for women-run organizations or women farmers, who usually do not possess the necessary networks, technical know-how or required financial resources. FPEC played an important role in supporting GNC to navigate the process and get all the necessary paperwork done.

Following procurement of land, the collection of green waste was necessary to create the first batch of compost. As noted earlier, the Jordan Valley is the country’s food basket, meaning that in addition to providing vital crops, the region generates hundreds of tons of green waste annually. Women members of the GNC started raising awareness among farmers in the area to persuade them to dump their green waste in the new composting facility. Following these efforts, a total of 100 tons of green waste was secured within two months. The first batch of 65 tons was collected and transferred to the composting facility before the COVID-19 related lockdown issued by the Government of Jordan on March 17, 2020. The second batch, weighing 35 tons, was collected two weeks after the complete lockdown. The green waste was collected from surrounding farms at no cost to the farmers, with FPEC and GNC providing all transportation and labor. In addition, green waste was collected from the land on which the composting facility is located. Equipment needed for composting was also purchased at this point, including a shredder machine, temperature gauge, humidity gauge, balance device, spade, trolleys, safety shoes and safety clothes. The JVL project made a total investment of approximately JOD 15,000 (equivalent to USD $21,000) to procure all the necessary equipment and to finance green waste transportation and manual labor.
Promoting Green Entrepreneurship: Connecting the Jordan Valley to Green Composting
Step 3: On-the-job training for green compost entrepreneurs

The trainer who had conducted capacity building for the women in Step 1 also supervised and mentored them to become green compost entrepreneurs. On-the-job training was essential to ensure that the women became familiar with the practical aspects of compost creation and sales. The trainer supported GNC members to develop structured data sheets to support daily collection of information which could be used for future reference as well. These sheets included:

- Daily effort sheets containing details on the quantities of green waste used, the additives from manure, how many times the piles were turned and watered, etc.
- Compost temperature records which measured temperature of the compost piles daily.
- Compost humidity records which measured humidity of the compost piles daily.
- Compiled humidity and temperature records which measured these daily at regular intervals per day of collection.
Step 4: Creation and Testing of Green Compost

Under the supervision of a trainer and with ongoing troubleshooting support from FPEC, the GNC was able to create green compost that was high quality fertilizer. From the 100 tons of green waste that was collected, a total of 25 tons of compost was generated in five months, which was divided into seven equal piles of more workable sizes allowing the women to water, test, and mix the waste as it decomposed. The Jordan Valley Authority’s laboratories then tested the green compost to measure ratios of nitrogen, carbon, organic matter, and moisture. All tests showed positive results, thus confirming the compost’s suitability and readiness for agricultural use. The GNC also tested its matured green compost for readiness and functionality and used this information to promote sales of its green compost through awareness workshops for farmers in the area.
Step 5: Creating Demand and Building Awareness

Creating demand through awareness raising among farmers began in Step 2, with the green waste collection, and continued throughout the process. FPEC conducted two awareness workshops in the southern Ghor area targeting 30 men farmers and all the women GNC members. Two additional workshops were planned but could not occur due to the second COVID-19 wave and the resulting lockdown in southern Ghor. These workshops aimed to introduce the green compost and its advantages for agricultural enhancement while introducing the women and their composting expertise to the predominantly men clientele/farmers in the area. The workshops built the women’s capacity to conduct such workshops themselves in the future. In addition, the workshops were a tool for market linkages—an opportunity to promote the green compost yield as a desirable product for purchase. The compost’s positive test results and ensuing healthy growth of plants by initial users of the green compost were also widely shared to stimulate demand.

Many farmers quickly grasped the benefits and cost effectiveness of the green compost and approached the GNC to share their interest in purchasing most of the compost even before it was ready. Having a well-located plot where the compost was being produced also meant that farmers in the area visited the plot to learn more. The plot served as a demonstration site with the women providing information and sharing their knowledge with the men farmers. The women’s confidence to engage with the men farmers significantly increased over time and the men were supportive of their composting enterprise from the very beginning.
Step 6: Selling the Green Compost and Creating Market Linkages

The green compost generated by this microenterprise was the first of its kind in the Jordan Valley; hence determining appropriate pricing for it was not easy, as there were no benchmarks for comparison. Through their interaction with farmers in the area, FPEC was able to support market research and pricing for green compost with some assistance from the JVL team. A price was estimated based on several factors, including the limited supply of compost currently available in the Jordan Valley, prices of other inorganic fertilizer options, and farmers’ level of interest in and knowledge of the different products. Based on FPEC and the GNC’s market research and price checking, they decided to sell one ton of green compost for between 20 to 25 JOD. After further discussion and price testing with farmers in the community, a price of 20 JOD/ton was set.

The first batch of 100 tons of green waste yielded 25 tons of compost, all of which was sold as soon as it was ready. One farmer, who bought 10 tons, reserved his purchase a month before the compost was completely mature. The remaining 15 tons were sold to individual local farmers in smaller quantities of five tons per each. With sales completed, the women have started a new composting phase expecting to generate the first 20 tons by August 2021.

The selling price of green compost produced by the GNC is relatively low, with their first yield generating only 500 JOD for the women entrepreneurs. Although green waste is available at no cost to the GNC, they still need to make enough profit to cover expenses related to transportation of green waste to the composting facility and the required manual labor.

In order to take this pilot to scale and become financially viable in the long-term, they will need to explore alternative solutions for marketing the compost and develop a detailed marketing plan. Potential new markets include buyers in Amman as well as developing a network of distribution points in shops selling agricultural materials and nurseries in the Jordan Valley. Accessing these new markets, however, will require good packaging and affordable transportation options. Attractive, environmentally friendly, and cost-effective packaging options were explored during the pilot with support from JVL and FPEC, and the women entrepreneurs will be able to select from these or other options as they continue and expand their business. Another solution could involve bartering or subsidization whereby the green compost is provided to farmers in exchange for the green waste they provide to the facility.
Lessons Learned

MEDA has learned valuable lessons by piloting a green compost business solution in the Jordan Valley – lessons that can hopefully benefit and inform others planning to undertake similar initiatives.

There is immense value in applying a Lean Start-Up methodology to a structured pilot/ business idea.

The JVL team applied several principles from the Lean Start-Up\(^6\) approach which emphasizes the use of a hypothesis-based business development process and a methodical “Build – Measure – Learn” approach, with limited deployment of financial resources. In this context, the use of sequential piloting allowed the team to validate different parts of the green composting business model in a controlled manner before adding additional aspects to the overall business. For example, in the very small and cost-effective first pilot, the focus was on the technical viability of compost production in the selected area and involved assessing aspects such as steady availability of the requisite raw material, time required to produce the compost, quality of the compost being produced, the contribution of the compost to soil fecundity within the project area and indication of approximate fixed costs for production. Once the technical viability had been verified, the second-round pilot – which was also relatively small but larger than the first – focused on refining the details of overall production costs, uncovering details of market demand, packaging and pack sizes, market channels, as well as retail and wholesale pricing. Careful attention to these components allowed the partners and the women entrepreneurs to develop better insights into the broader feasibility and viability of the business model in a stepwise fashion and at relatively low cost and low risk. The amount of information and knowledge generated relative to the resources deployed was very favourable. It also provided the women entrepreneurs with key data needed to tweak various components and costs in order to ensure viability of the business when taken to scale.

Green compost is a countrywide need that can be met by empowering farmers and local communities.

The Jordan Valley is not only the country's food basket but also includes several tourism destinations, making the region very significant to Jordan's economic growth. The huge amounts of green waste yielded from agricultural lands, the heavy use of pesticides and manure composting all contribute to the pest and waste issues which are affecting local communities and their tourism potential. Besides the additional source of income from generating and using/selling compost, members of the GNC can now also train other farmers on how to produce green compost and this training could become another source of income. Green composting could be a viable solution not only to the environmental issues created due to the use of manure and the resulting pests and flies but also generate incomes for local communities and promote recycling of green waste into composting that can then further benefit farmers' yields.

\(^6\) http://theleanstartup.com/ and https://hbr.org/2013/05/why-the-lean-start-up-changes-everything
New products and services, such as green compost, may allow more space for women to successfully engage in non-traditional economic activities.

The agricultural market system in the Jordan Valley is heavily dominated by men and most farming activities (except for some weeding and harvesting tasks) are traditionally seen as ‘male’ activities. Despite this prevailing context, there was a high degree of acceptance of the GNC and its women members in the green composting venture right from the onset. Further reflection on this situation suggests that when it comes to a new product or service that has significant market demand and for which there are objective and empirical quality standards, it does not matter who fulfills the demand. In other words, it doesn’t matter if a man or woman develops the product, as long as someone does. Scientific testing of the green compost and its visible benefit on crops also led to easy acceptance of the product, regardless of who produced it. It could also be that since no one was filling the market demand for green compost, traditional actors (men) in the agriculture value chain did not feel threatened by non-traditional actors (women) in their communities. The GNC women members felt welcomed and encouraged right from the onset of their green composting pilot, with farmers keen to access the new product and future skills/training from the women.

Successful investment is only not about size, but also commitment, enthusiasm and belief.

JVL’s financial and human investment into this business solution was approximately USD 21,000. When this amount and its resulting benefits are compared to the German GIZ investment of USD 1 million in the Karak composting project, it is evident that success is not only about the size of the investment. The GNC’s yield of green compost with the use of simple equipment and minimal land led to positive test results and the entire yield was sold. Reasons for the success of JVL’s business solution include good planning by FPEC and the JVL team, selection of good partners, stakeholder consultations, learning from other initiatives, and the commitment, enthusiasm and belief of the women involved in microenterprise. MEDA and FPEC’s role in encouraging the women and building their confidence and technical expertise was also essential to ensuring success – addressing the socio-cultural barriers for women’s engagement in the agriculture sector goes hand-in-hand with making an investment.

Adoption of green compost by farmers and local communities requires changes in farmers’ perceptions, incentives for change and good communication with stakeholders.

Jordanian farmers are increasingly seeing the benefits of green composting and interest in the agricultural community is growing; hence adoption of widespread composting could be possible. Quick sales of the compost demonstrated that farmers are interested in healthier alternatives to chemical fertilizers and raw animal manure, but that adoption will require more than just competitive prices. The widespread availability of other sources of fertilizer, such as very cheap manure, is a challenge. Despite governmental instructions against the use of these cheap products, farmers have easy access and keep using them.
Approaches to increase adoption of green compost include strengthening knowledge and awareness, including its benefits compared to current agriculture practices and other less beneficial composting approaches. Establishing incentives to encourage farmers to purchase green compost (such as a one-time small discount or subsidy) is also effective. Another incentive is the ability to start their own composting microenterprises using their existing land and green waste generated from farming. Communication is also key to ensuring adoption and this can be done through various means such as workshops, in-person meetings and brochures.

**Market linkages and economies of scale are essential for financial viability of a microenterprise.**

Although the financial returns from the pilot’s first yield were not substantial, the possibility of growth and profitability certainly exists. However, this will require increasing the quantity of compost produced in the next cycle to benefit from the economies-of-scale resulting in a lower unit cost of production. In addition, market research pointed to opportunities for developing alternative markets in Amman and the Jordan Valley where packaging the product into smaller pack sizes of up to 20Kgs would result in a higher per unit return. For example, the market research in Amman pointed to opportunities to sell branded and packed compost through garden centres, supermarkets and other retail outlets to meet the growing demand from urban consumers and hobby gardeners.
Conclusion

The COVID-19 pandemic resulted in many challenges for GNC’s composting activities. The first government-instituted lockdown coincided with the commencement of compost creation, making it difficult for workers to reach the site, which affected the compost’s maturity period since no turning or watering could be done during that time. The lockdown also delayed the transfer of 35 additional tons of collected green waste to the composting facility, specifically the shredder machine. Despite these challenges, the GNC and FPEC successfully produced an impressive yield of green compost that tested positively both on-site and upon laboratory examination. The GNC members are now capable of running the facility by themselves and are very excited about having a new source of income and innovation in the Jordan Valley. The first batch of 100 tons yielded 25 tons which was completely sold out, despite extremely challenging market conditions, the negative perceptions of farmers and competing low-cost options (such as chemical fertilizers and raw manure) that are widely used throughout the area.

JVL’s solution to green waste management has resulted in unbridled commitment, enthusiasm and bravery from the women to succeed. The pilot has resulted in several opportunities for other stakeholders to scale up and leverage for further positive impact on the environment and agriculture sector in the Jordan Valley. The composting facility and equipment is in place and fully functioning and can now serve other farmers in the area. The women entrepreneurs are now technically equipped to produce green compost and share their knowledge with others, including with farmers in the area. These women can be master trainers providing technical expertise, potentially on a fee-basis. These women have become role models for composting and have new confidence in their abilities to produce and sell green compost. This pilot has provided them with an opportunity to take on leadership positions in non-traditional roles within the agricultural sector. Farmers and agricultural workers associated with the JVL pilot have changed their attitudes and practices in favor of using green compost and better management of their green waste. It will now be easier to convince more farmers to adopt green composting as an alternative to animal manure and chemical fertilizers. Last but not least, the pilot proved that the demand for green compost exists and that farmers are willing to pay for such. Successful sales of the group’s first green compost yield demonstrates the prevailing demand for green composting products in the Jordan Valley and has boosted interest of others to explore greener solutions for agriculture and waste management in Jordan.
CT entrepreneur displays the compost she made after receiving training from the CT Consortium.

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