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The Waste Sector in Jordan

This article is devoted to analyzing the National Green Growth Plan 2021–2025 of the Hashemite Kingdom of Jordan in a Waste Sector, which establishes green growth as a top national priority. The main goal of the work is to study the socio-economic aspects, such as environmental sustainability, social development and poverty reduction, green growth inclusiveness, and resource use efficiency. The result is oriented to support one of the six green economy sectors — Waste — and to achieve sustainable economic growth objectives. The research seeks to understand what prevents Jordan from implementing the goals established in current plans and strategies. The author offers suggestions for the development of Jordan's future-proof vision for a green economy — waste picking could be an option for reducing poverty and innovation outcomes, as salvageable waste could be used as inputs to the manufacturer of products, thereby reducing the need for importing secondary raw materials.

Keywords: good jobs, economic growth, industry, innovation and infrastructure, peace, justice, strong institutions, consumption, environmental objectives, waste pickers, sustainable management, poverty reduction

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Introduction

Jordan is a small lower middle-income country located in the Middle East bordering Iraq, Saudi Arabia, Syria, Palestine, and Israel, with a population of 11.2 million [1]. Jordan suffers from natural resource scarcity, particularly freshwater resources which are decreasing at an

alarming rate due to unsustainable groundwater exploitation and the negative trend of precipitation in recent decades [2]. Jordan's economic and social well-being is directly linked to the political status and relationship with its neighboring countries [3]. The current economic growth

scheme in Jordan is unsustainable due to the substantial dependence on imported fossil fuels which, under the politically unstable conditions in the region, may lead to energy insecurity in the Country. The net annual GHG emissions in Jordan were roughly 29,000 Gg CO₂-eq in 2016 and are likely to double by 2030 should the current growth scheme continue. In terms of social development, growth is highly unbalanced between urban and rural parts of the Country, and there is a continuous loss of talent and skills to other economies due to the lack of challenging and skillful employment opportunities [2].

Literature review

A number of articles have been addressed to this subject over the last five years. The green experts — Pervez Alam and Ahmade Kafeel in their article “Impact of Solid Waste on Health and the Environment” claimed that unmanaged waste or pollution from industrial, commercial, agricultural, and residential sources can pose significant barriers to the preservation of natural capital as a result, this pollution degrades ecosystem health, adversely impacts public health and people’s livelihoods, and prevents the economy from growing sustainably [4]. Ellen MacArthur, Dominic Waughray, and Martin Stuchtey in their article “Rethinking Plastics, Starting with Packaging” estimated that 95% of the plastic packaging that enters the economy is discarded as waste, and 32% of this waste escapes municipal waste management [5].

We need to mention that the amount of municipal solid waste, one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Ten years ago, there were 2.9 billion urban residents who generated about 0.64 kg of municipal solid waste per person per day (0.68 billion tonnes per year) [6]. It is estimated that today these amounts have increased to about 3 billion residents generating 1.2 kg per person per day (1.3 billion tonnes per year). By 2025 this will likely increase to 4.3 billion urban residents generating about 1.42 kg/capita/day of municipal solid waste (2.2 billion tonnes per year).

A group of scientists: Nicola J. Beaumont, Margrethe Aanesen, Melanie C. Austen, Tobias Börger, James R. Clark, Matthew Cole, Tara Hooper, Penelope K. Lindeque, Christine Pas-

coe, and Kayleigh J. Wyles in “Global Ecological, Social and Economic Impacts of Marine Plastic” have done research on how ingested plastic may affect to marine life and they come up with a conclusion that the chemicals contained in plastic can cause generational and population-level impacts on marine life, which travel up the food chain [7]. The Green Growth Action National Action Plan 2021–2025 (GG-NAP, or GGNAP) in the report “Waste Sector” analyzed the role of Jordanian municipalities and the required expenses [8]. Maheshi Danthurebandara, Steven Van Passel, Dirk Nelen, and Yves Tielemans in the article “Environmental and Socio-Economics Impacts of Landfills” [9] described the cost drivers for emissions of harmful greenhouse gases GHGs, while David C. Wilson, Costas Velis, and Chris Cheeseman in their work “Role of Informal Sector Recycling in Waste Management in Developing Countries” offered a solution to the waste management — waste pickers that could be transformed into an avenue for substantial poverty reduction and innovation outcomes [10].

The Waste Sector Green Growth Action National Action Plan 2021–2025 (GG-NAP) outlines a green growth framework and actions for the sector aligned with the National Green Growth Plan (NGGP), Jordan Vision 2025, and Nationally Determined Contributions (NDCs) under the Paris agreement. At the heart of the green growth approach lies the leveraging of the sector’s resilience through economic growth that is environmentally sustainable and socially inclusive. In 2018, 91% of Jordan’s population lived in urban areas, a historically high rate of urbanization that reflects the ‘typical’ challenges associated with rapid and unplanned growth, in addition to the challenges posed by the unique demands placed on services as a result of the Syrian refugee crisis. On average, Jordanians produce 0.81 kg of municipal waste per capita per day [11], a rate 26% higher than counterparts in other upper-middle income countries [12]. The waste situation in Jordan is a key priority green growth agenda that presents both environmental challenges and socioeconomic opportunities. In terms of the composition of Jordan’s municipal solid waste, over 50% of the waste generated by households in Jordan is food waste [13], and the recycling rate for municipal waste, standing at 7%, is low, even when compared with the average of 10% across the Gulf Cooperation Council (GCC) states [14].

Other types of waste, such as hazardous waste, medical waste, construction and demolition waste, and electronic waste are also generated in substantial or growing volumes in Jordan, with inadequate treatment and disposal means, as well as generally weak enforcement regimes. In terms of the environmental impact, landfilled waste is an important component of Jordan's GHG emissions profile, contributing 10% of GHG emissions [14], a figure that is expected to grow as the population grows. The waste sector illustrates the challenges and opportunities of shifting toward more resource-efficient urbanization and, ultimately, a more circular economy — chief objectives of the country's green growth agenda. For example, investing in waste segregation and behavior change campaigns, as well as fostering recycling and reuse habits, increases opportunities for the growth of micro, small, and medium enterprises. Technological innovation, the creation of incentives for investment, and improved resource efficiency in consumption and production processes can reduce the burden on government budgets while supporting both economic growth and environmental objectives.

Enhanced natural capital

Jordan's first national green growth objective is to enhance the country's natural capital. For that purpose, it aims to improve the quality of natural resources used to generate economic growth and provide ecosystem services that support economic activities.

Natural capital is defined as the "stock of natural assets, including geology, soil, air, water, and all living things." [15, 16]. These natural assets are used to generate economic growth by driving business and supporting livelihood. They are also used to maintain ecosystem services, such as providing clean water, soil, and air, all of which have an economic value. Unmanaged waste or pollution from industrial, commercial, agricultural, and residential sources can pose significant barriers to the preservation of natural capital. This waste can leak toxic, corrosive, reactive, or otherwise dangerous substances into the soil and water bodies [4]. Untreated hazardous materials, such as industrial or medical waste, can leak heavy metals (like zinc or lead) and toxic chemicals into the air, soil, and sur-

face or groundwater. Ultimately, this pollution degrades ecosystem health, adversely impacts public health and people's livelihoods, and prevents the economy from growing sustainably.

Waste can have long-term impacts on the environment and societies, even those far from the site of disposal. It is estimated that 95% of the plastic packaging that enters the economy is discarded as waste, and 32% of this waste escapes municipal waste management [5]. Taken together with plastic waste stemming from fishing and ocean-based recreation, the annual volume of plastic waste dumped into the world's oceans is roughly 8 million tons. These plastics can entangle or otherwise severely damage marine life. Ingested plastics — and the chemicals contained therein — can cause generational and population-level impacts to marine life, which travel up the food chain. By consuming marine plastics and related chemicals. The total cost of multi-level impacts of ecosystems degradation from plastics is estimated to be USD 2.5 trillion per year [7]. Municipalities are responsible for covering the full costs of waste collection, and sometimes, in a few cases, the cost of disposal is small landfills, waste separation at transfer stations. It can stretch limited financial resources to cover these costs and distract from considering the indirect costs. The collection, separation, transport, storage, and treatment of solid waste (SW) are expansive, the environmental costs of waste management can be difficult to assess and vary substantially depending on the specific context [8, p. 2]. Cost drivers include emissions of harmful greenhouse gases GHGs (such as methane and carbon dioxide) and pollution from landfill leachate [9]. Like with ocean plastics, without the proper sanitary lining, leachate seeps into the soil and water, and substances such as metals or other chemical compounds remain in the ecosystem, damaging plants, animals, and humans who come in contact with them. Ex-post rehabilitation from landfill leachate pollution is a lengthier, more expensive process than investing in sanitary landfills.

Sustainable economic growth and waste

Jordan's second national green growth objective is to ensure sustainable economic growth. Enabling sustainable economic growth requires the effective management of a country's waste

sector. Waste is a predictable consequence of economic growth, and as societies develop, their waste streams become more complex [17]. Improved technical skills, innovations, social awareness, and behavior change are required to sustainably manage this situation. Yet, many developing countries struggle with both the technical and financial burdens of waste management, with costs representing anywhere from 20 to 50% of municipal budgets globally [18]. The effectiveness of the waste sector and incentive structures are equally important and for these incentives to be implemented the dialogue between the public and civil society is required.

To achieve sustainability it will need an engagement of the private sector with its financial resources such as investment and revenue generation. The government can shift the responsibility of managing post-consumer waste to the producers and generate required revenues through the implementation of Extended Producer Responsibility (EPR) programs. According to the EPR principle, producers (including developers and manufacturers) are required to incorporate the environmental costs associated with the product's end-of-life (or its packaging) as well as reduce the impacts thereof [19]. To implement the "polluter pays" principle, EPR programs aim to enhance the prevention, reduction, reuse, recycling, and recovery of waste. This process can lead to innovation, creating an improved ability to capitalize on waste as a resource and diversion from landfills [8, p. 3]

EPR schemes may help businesses to reevaluate their business models, future business perspectives, extend the product life cycle, and provide packaging buyback programs. These could be achieved by efficient waste management via R&D plans in the waste sector. Moreover, the government can invest in capacity-building programs and encourage medium-sized enterprises (SMEs) to improve waste recovery systems.

The lack of management in waste systems can cause a list of unintended economic consequences in the long term. There are substantial indirect costs associated with poor municipal solid waste management (MSWM) since this can lead to harmful (an expensive fix) externalities, such as illness and death of humans, contamination of waterways and soil, damage to municipal drainage systems, and high GHG emissions. The follow-on effect of these is the low quality of life

to local populations, high remediation costs, and deterrence of visitors to the country (for tourism or business) [8, p. 3].

Social development and poverty reduction

Social development and poverty reduction is a third national green growth objective and the main part of Jordan's long-term development plan. This objective is a predominant element of green growth inclusiveness. To achieve it, the government is focusing on poverty reduction by reducing inequality in society such as woman's empowerment and gender equality, which are the critical part of economic growth. A 2025 McKinsey study found that women generate only 37% of the global domestic product (GDP), but that closing this gap could add between USD 12 and 28 trillion to the global economy [20]. In the Middle East and North Africa (MENA) region, women generate only 18% of GDP, suggesting greater inclusion is a major economic growth opportunity. Green growth recognizes women and men with a sense of equality, and the poor and marginalized as not simply vulnerable, but as active agents of change for more sustainable growth [8, p. 4]. The waste sector employs around 40 million workers across the world and is, therefore, a significant source of livelihood, poverty reduction, and social development [21]. Studies indicate that around 1% of the urban population in developing countries (approximately 15 million people) rely on waste picking for their livelihoods [22, 23].

Waste pickers, if empowered, may be able to transform their occupation into an avenue for substantial poverty reduction and innovation outcomes, using salvageable waste as inputs to the manufacture of products, reducing the need for imported secondary raw material [10].

Waste picking in developing countries creates a livelihood for many individuals living in poverty, while it creates a high level of informality across all segments of the waste system and instability that is caused by fluctuating market prices for recovered materials. Moreover, limits in transport options and storage space for collected waste make reaching economies of scale difficult. While informal waste pickers can reduce the amount of time and resources government must spend on the collection, transport, and

management of solid waste (SW), extending the life of SW management facilities and diverting reusable materials away from landfills [8, p. 21].

Municipalities play a key role in leveraging community-driven waste management, they are obligated to consult communities and spread awareness. The government can introduce new schemes for managing waste based on women's and men's activities and livelihoods; e.g. buying and selling household garbage, re-using and recycling waste materials, collecting and disposing of human and SWs in a safe manner, and keeping the streets clean [24]. Transitioning to a more formal waste recycling and material recovery system provides a socio-economic opportunity to sustain landfill infrastructure, improve the livelihoods of many poor and marginalized workers, and offer decent jobs for all. Hence, the work of diverting material from waste stream improves resource circularity, while simultaneously enhancing social resilience. At the same time, the government's support for the protection of labor in the waste sector, its ability to involve local communities in investment and policy decision making, and the organization of the waste management and materials markets can also cultivate successful private sector ventures, and globally contribute to the ultimate goal of achieving inclusive green growth through the waste sector [8, p. 21].

The Waste sector in Jordan is governed by several national authorities and defined primarily by the solid waste management activities undertaken by municipalities and by the Ministry of Local Administration (MOLA), as well as the Ministry of Environment (MoEnv). The Action Plan Includes priority interventions to promote the sustainable management of municipal solid waste, electrical and electronic waste (e-waste), construction and demolition (C&D) waste, and other waste streams. Other important types of waste, such as wastewater (addressed in the Water sector action plan, for example), manure and compost (addressed in the Agriculture sector action plan), and various interventions related to resource efficiency (e.g in the hospitality sector in the Tourism sector action plan) are located in other sectoral action plans [8, p. 18].

Resource efficiency

Jordan can reach its fourth national green growth objective via responsible production

and consumption, by improving efficiency in using resources. Resource use efficiency can be achieved by two elements: producing the same economic output with fewer environmental inputs and lower levels of pollution, and reducing the levels of pollution associated with, or embedded, in consumption. Sustainable consumption and production are about doing more and better with less. It is also about decoupling economic growth from environmental degradation, increasing resources efficiently, and promoting sustainable lifestyles. Sustainable consumption and production can also contribute substantially to poverty alleviation and the transition towards low-carbon and green economies (according to Sustainable Development Goal 12, or SDG 12, established by the United Nations in 2015 [25, 26]). To reach responsible consumption and production might require cooperation from the manufacturers, government, retailers, and society.

Recommendations

Social development and poverty reduction is the main part of Jordan's long-term development plan. This objective is a predominant element of green growth inclusiveness. To achieve it, the government should focus on poverty reduction by reducing inequality in society such as women's empowerment and gender equality, which are the critical part of economic growth. Therefore, Waste picking could be an option for poverty reduction and innovation outcomes, as salvageable waste could be used as inputs to the manufacturer of products, and reduce the need for imported secondary raw materials.

The government is recommended to coordinate the reduction in consumption and production wastes by providing a reliable infrastructure, and working with the private sector to develop regulations that can discourage the use of harmful materials in manufacturing processes.

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Шаламай О. А.

Сектор відходів у Йорданії

Стаття присвячена аналізу Національного плану зеленого зростання на 2021–2025 роки Йорданського Хашимітського Королівства у секторі відходів, який визначає зелене зростання як головний національний пріоритет. Основною метою роботи є вивчення соціально-економічних аспектів, таких як екологічна стійкість, соціальний розвиток і скорочення бідності, інклюзивність зеленого зростання та ефективність використання ресурсів. Результат орієнтований на підтримку сектору відходів як одного з шести секторів "зеленої" економіки та досягнення цілей сталого економічного зростання. Дослідження має на меті зрозуміти, що заважає Йорданії реалізувати цілі, встановлені в поточних планах і стратегіях. Запропоновано рекомендації щодо зеленого зростання для розробки перспективного бачення зеленої економіки Йорданії — збір відходів може стати одним із інструментів скорочення бідності та інноваційних результатів, оскільки придатні для переробки відходи можуть бути використані як сировина для виробника продукції, тим самим зменшуючи потребу в імпорті вторинної сировини.

Ключові слова: хороші робочі місця, економічне зростання, промисловість, інновації та інфраструктура, мир, справедливість, сильні інституції, споживання, екологічні цілі, збирачі відходів, стале управління, скорочення бідності