

The Role of Green Jobs in Sustainable Development: A Comparative Study of Algeria's Green Dam Project and the U.S. Shelterbelt Initiative

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Abstract:

This study compares Algeria's Green Dam Project (1970s) and the U.S. Shelterbelt Project (1930s) to analyze the role of green jobs in sustainable development. Both initiatives were large-scale responses to environmental crises—desertification and the Dust Bowl, respectively—aimed at combining ecological restoration with economic relief through mass employment. By examining their historical contexts and outcomes, the research highlights how environmental infrastructure projects can successfully drive socio-economic stability. The findings provide critical lessons for modern policymakers on designing programs that effectively integrate climate action with job creation.

Keywords: Green jobs; Sustainable development; Green Dam; Shelterbelt.

Jel Classification Codes: XN1, XN2.

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1. INTRODUCTION

Climate change and environmental challenges have made green jobs essential for building a sustainable future. These jobs help protect the environment while providing people with meaningful work and income. Two important historical projects demonstrate this connection: Algeria's Green Dam Project and the United States' Shelterbelt Project. The Green Dam, started in the 1970s, aimed to stop the Sahara Desert from expanding by planting trees across northern Algeria. The Shelterbelt Project, launched during the 1930s, created windbreaks across American farmlands to prevent soil erosion after devastating dust storms. Both projects employed thousands of workers to plant millions of trees, addressing urgent environmental problems while creating jobs during difficult economic times. This study compares these two initiatives to understand how they balanced environmental goals with employment opportunities. By examining their approaches, successes, and challenges, we can learn valuable lessons for today's green job

programs. Understanding these past projects helps countries develop better strategies for combining environmental protection with job creation. This research contributes to achieving sustainable development goals that benefit both people and the planet.

2. Problem Statement

In light of the growing importance of sustainability and green employment, the main research question in this study is: How do the Green Dam Project in Algeria and the Shelterbelt Project in the United States contribute to the promotion of green jobs and the achievement of sustainable development objectives?

3. Sub-Questions

To support the investigation of the main research question, the following sub-questions are proposed:

- What were the historical and socio-economic circumstances that led to the establishment of each project?
- How has each project contributed to environmental goals such as combating desertification, reducing soil erosion, and restoring ecosystems?
- To what extent has each project created green jobs and supported sustainable development?
- What are the main similarities and differences in the planning, implementation, and long-term outcomes of the two projects?

4. Research Hypotheses

In order to effectively investigate the primary research problem and the associated sub-questions, the following hypotheses have been developed:

First Hypothesis: Both projects were created during times of environmental crisis and economic difficulty.

Second Hypothesis: Both the Green Dam Project and the Shelterbelt Project have generated significant green employment and contributed to sustainable development,

Third Hypothesis: Each project has made meaningful progress toward environmental protection.

Fourth Hypothesis: While both projects share similar environmental and social objectives, they differ in their execution methods.

5. Importance of the Study

This study is important because it sheds light on how large-scale environmental projects can simultaneously protect ecosystems and create meaningful green jobs in different national contexts. By comparing Algeria's Green Dam Project with the United States' Shelterbelt Project, the research helps to clarify which strategies have been most effective in linking ecological restoration with socio-economic benefits for local communities. It also contributes to a better understanding of how historical and socio-economic conditions influence the design, implementation, and long-term success of such initiatives. The findings can provide useful guidance for policymakers, planners, and researchers who seek to design future green job programs that genuinely support sustainable development, especially in regions facing desertification, land degradation, and unemployment.

6. Study Objectives

This study aims to achieve a set of objectives related to green jobs and sustainable development through a comparison of the Green Dam Project in Algeria and the Shelterbelt Project in the United States:

- Analyze the historical, social, and economic circumstances that led to the establishment of both the Green Dam Project and the Shelterbelt Project.
- Assess the extent to which each project has contributed to creating green jobs and improving living conditions for beneficiary local communities.
- Examine the contribution of both projects to achieving environmental goals, such as combating desertification, reducing soil erosion, and restoring ecosystems.
- Compare the two projects in terms of planning approaches, implementation methods, and long-term outcomes.
- Draw lessons and insights from both experiences with the aim of providing recommendations that can assist policymakers in designing and implementing future green job initiatives that support the achievement of sustainable development.

7. Methodology Used

This study uses a comparative approach because it is the best way to understand how the Green Dam Project in Algeria and the Shelterbelt Project in the United States achieved their goals. By comparing these two projects, we can identify what worked well in each case and what challenges they faced. This method helps us see which strategies are effective in different settings and which lessons can be applied to future green job programs in other countries. Comparing projects from different times and places allows us to learn more than studying just one project alone, making it easier to develop practical recommendations for policymakers working on sustainable development initiatives today.

8. Conceptual framework

8.1. Definition of green jobs

Green jobs are defined as positions in sectors such as renewable energy, energy efficiency, environmental protection, and sustainable agriculture that contribute to preserving or restoring environmental quality while providing decent employment opportunities (Bowen et al., 2018). The International Labour Organization (ILO) defines green jobs as "decent jobs that contribute to preserving or restoring the quality of the environment, whether it is climate, ecosystems or biodiversity" (ILO, 2013, p. 1). According to the United Nations Environment Programme (UNEP), they encompass "work in agriculture, manufacturing, research and development, administration, and services that contribute to preserving or restoring environmental quality" (UNEP, 2008, p. 3).

8.2. Definition of Sustainable Development

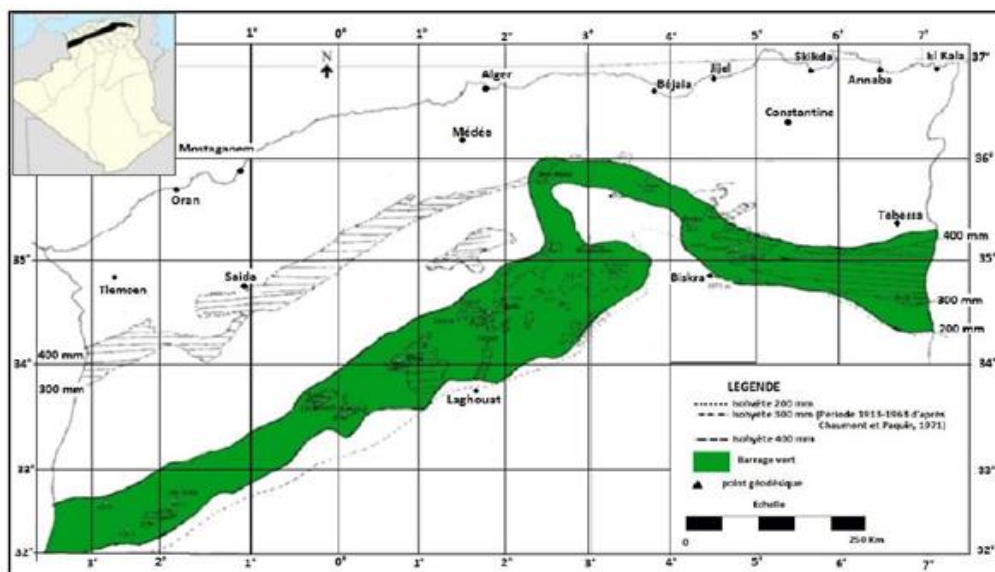
Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development [WCED], 1987, p. 43).

9. Historical and Socio-economic Circumstances of the Green Dam in Algeria and the U.S. Shelterbelt Initiative

9.1. Historical and Socio-economic Circumstances of the Green Dam in Algeria

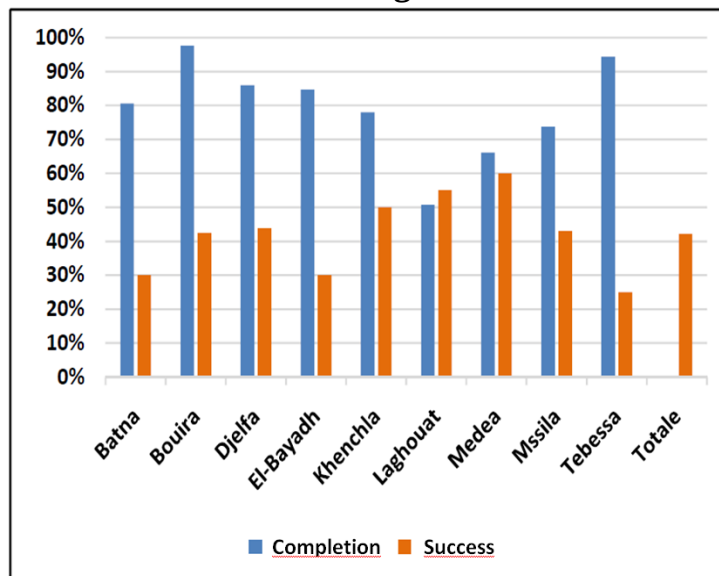
The Green Dam is among Algeria's largest strategic environmental initiatives, launched by the Algerian government in 1971 to combat desertification, protect ecosystems, and support sustainable development. Its core objective was to establish a tree belt stretching roughly 1,500 km from the Moroccan border in the west to the Tunisian border in the east, with an average width of about 20 km. Covering around 3 million hectares across 13 provinces, the project was designed to curb the northward advance of the desert, safeguard cultivated land and steppe ecosystems, and reduce desertification, soil degradation, and related land deterioration in Algeria's semi-arid High Plateaus. (Mohamed et al., 2025, p. 1813).

Fig.1. Green dam project map



Source: Zehraoui, 2023

Fig.2. Completion/Success rates: Overall and regional breakdown

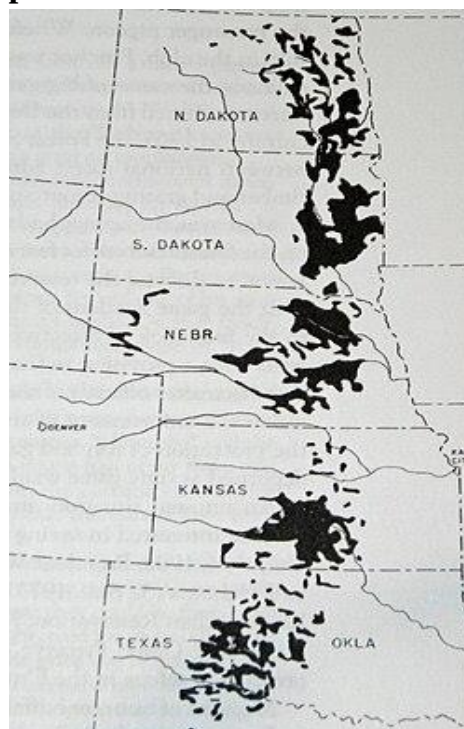


Source: Zehraoui, 2023

9.2. Historical and Socio-economic Circumstances of the U.S. Shelterbelt Initiative

The U.S. Shelterbelt Initiative, formally known as the Prairie States Forestry Project (PSFP), emerged during the 1930s as a direct federal response to the devastating Dust Bowl crisis that threatened the agricultural sustainability of the Great Plains region (Karle et al., 2021, p. 90). Operating between 1935 and 1942, the project represented an unprecedented collaboration between the U.S. Forest Service and private landowners, resulting in the planting of approximately 220 million tree seedlings across a vast geographic expanse stretching from the Texas Panhandle to the Canadian border (Karle et al., 2021, p. 90). The initiative ultimately produced 18,600 miles of protective tree shelterbelts covering 240,000 acres on 30,000 farms across six states (Karle et al., 2021, p. 90). Soil conservation was the primary preoccupation during this period, driving the federal government's commitment to this massive afforestation effort (Karle et al., 2021, p. 91). President Franklin D. Roosevelt championed the project based on his conviction that soil conservation on private lands constituted a legitimate public concern, warranting federal intervention and funding (Karle et al., 2021, p. 91). Unlike other New Deal programs, the PSFP uniquely provided federal resources for conservation activities on privately-owned agricultural lands, implementing agroforestry methods in an economically distressed region (Karle et al., 2021, p. 91). The project embodied the intersection of New Deal-era federal activism with progressive conservation traditions, aiming to preserve the Jeffersonian ideal of the family farm through comprehensive, scientifically-informed planning (Karle et al., 2021, p. 91). Today, this massive infrastructure planting serves as the foundation for modern agroforestry practices, with PSFP shelterbelts continuing to provide critical ecosystem services whose importance is amplified by contemporary climate change challenges (Karle et al., 2021, p. 91).

Fig.3. Shelterbelt initiative map



Source: U.S. National Archives and Records, 1934

Both the Algerian Green Dam and the U.S. Prairie States Forestry Project were established as emergency-style environmental responses to severe land degradation, but each emerged from a different historical and ecological context.

Algeria's Green Dam was launched in 1971 in a post-independence nation-building period, when the state was seeking large strategic projects to protect natural resources and secure long-term development. Its creation was driven by rising desertification risks in the semi-arid High Plateaus, where soil degradation, fragile steppe ecosystems, and pressure on agricultural land made the northward spread of desert conditions a national concern. The project therefore framed afforestation as territorial protection, aiming to create a long tree belt to stabilize soils, reduce land deterioration, and safeguard ecosystems and cultivation zones.

The U.S. Prairie States Forestry Project (PSFP) was created during the 1930s as a direct response to the Dust Bowl, when drought and intense wind erosion caused massive top soil loss, dust storms, crop failures, and economic collapse across the Great Plains. In the New Deal era, the federal government treated soil conservation as a public priority, justifying intervention even on private farmland. The PSFP was designed as a practical conservation measure: planting shelterbelts on farms to reduce wind speed, protect fields, and restore agricultural stability through a coordinated partnership between federal agencies and landowners.

In short, the Green Dam grew out of a long-term national strategy to combat desertification at a broad territorial scale, while the PSFP emerged from an acute economic and ecological crisis, using federally supported shelterbelts to rapidly protect private farms and conserve soil.

10. The Role of the Green Dam and the Shelterbelt Initiative at Combating Desertification, Reducing Soil Erosion, and Restoring Ecosystems

10.1. The Green Dam Project

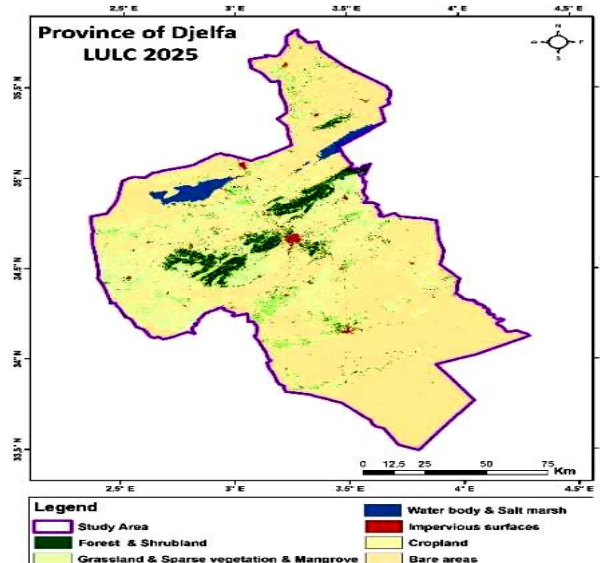
A monumental ecological barrier spanning 1,500 km from East to West and 20 km in width, originally covered an area of 3.7 million hectares across 13 provinces, 183 municipalities, and 1,200 sectors. Under the rehabilitation plan effective from 2023, the total area is projected to expand to 4.7 million hectares by 2026 (Benkheira, 2025, p. 5). This strategic expansion is supported by a substantial financial commitment, with a total budget of 75 billion DZD allocated for the 2023-2030 period, including an initial tranche of 12 billion DZD for 2023 and 5.7 billion DZD for 2024 (Benkheira, 2025, p. 8). The physical execution of the project has accelerated significantly; between 2023 and early 2025, approximately 29,000 hectares were reforested—comprising 18,000 hectares in 2023 and 11,000 hectares in 2024—alongside the creation of 45 nurseries with a production capacity of 120 million seedlings to support ongoing needs (Ouldache, 2021, p. 15). From a biodiversity perspective, recent assessments in key sectors like Djelfa have cataloged 109 plant species belonging to 21 botanical families, where Mediterranean species account for 38.5% of the flora, highlighting the project's role in enhancing ecological resilience against invasive pests (Bourahla & Boukherouba, 2024, p. 4). Furthermore, the rehabilitation efforts include the development of 376 km of rural tracks and 80 water points, reinforcing the socio-economic stability of the region while combatting soil erosion (Ouldache, 2021, p. 18).

Remote sensing analyses of the Djelfa region for the period (1985–2025) indicated that the project contributed to increasing forest cover during specific intervals. A peak in reforestation was recorded between 1995 and 2005, with the conversion of 866.55 km² from non-forest land to

forest, reflecting the success of afforestation policies during that period in stabilizing the soil (Orabi et al., 2025, p. 1821). regarding biodiversity and climate resilience, the project in its new phase aims to move away from monoculture planting (such as Aleppo pine) toward diversifying plant species to include fruit trees and drought-resistant indigenous varieties, thereby enhancing biodiversity and creating more resilient ecosystems (Orabi et al., 2025, p. 1812). Current nurseries (45 facilities) support the production of 120 million seedlings, including climate-adapted species to ensure vegetation sustainability (Orabi et al., 2025, p. 1813).

In terms of continuous rehabilitation, current plans (2023–2030) involve extensive afforestation operations, including the rehabilitation of 485.10 km² of the Green Dam, forest expansion of 850.37 km², and the expansion of agro-pastoral areas over 4,818.83 km², directly contributing to the restoration of degraded lands and protection against sand encroachment (Orabi et al., 2025, p. 1824). However, despite these efforts, data revealed significant environmental challenges, with a recorded forest cover loss of 761.40 km² in the period (2015–2025) compared to only 284.40 km² of reforestation in the study area, underscoring the urgent need for current interventions to compensate for this loss and protect the environment from continued degradation (Orabi et al., 2025, p. 1821).

Fig.4. Maps of land cover change analyses in the province of Djelfa



Source: Orabi et al., 2025

10.2. The Shelterbelt Initiative

Officially known as the Prairie States Forestry Project, represented a pioneering approach to environmental restoration in the United States during the 1930s. Launched under the New Deal, this massive tree-planting program aimed to combat the devastating effects of the Dust Bowl by establishing windbreaks across the Great Plains (Droze, 1977, pp. 72-73). The initiative's primary objectives included mitigating desertification through strategic afforestation, reducing soil erosion caused by wind and water, and restoring degraded ecosystems that had been depleted by intensive agricultural practices (Hansen & Libecap, 2004, pp. 665-694). Over the course of eight years, from 1934 to 1942, the project resulted in the planting of more than 220 million trees across approximately 30,000 farms, creating protective belts that stretched from North Dakota to Texas

in a zone approximately 100 miles wide (Droze, 1977, p. 72). These shelterbelts not only stabilized soil and improved agricultural productivity but also contributed to biodiversity conservation and climate regulation in the affected regions, as windbreaks have been shown to sequester carbon and provide critical wildlife habitat (Brandle et al., 2004, p. 72). In Nebraska during and after the Dust Bowl era. Initiated in response to severe drought and wind erosion in the 1930s, the project aimed to establish a vast network of windbreaks to protect the soil and stabilize the Great Plains ecosystem (Hergenrader, 2008, p. 1).

Nebraska became a focal point of this initiative, with over 4,000 miles of windbreaks totaling 51,621 acres planted between 1935 and 1942, exceeding the mileage planted in any other state involved in the project (Hergenrader, 2008, p. 3). Evaluations of these plantings demonstrated their long-term effectiveness; a study conducted in 1954 found that the majority of the windbreaks continued to serve as effective barriers against the wind (Hergenrader, 2008, p. 3). Beyond their primary function of preventing soil erosion, these shelterbelts have provided enduring ecological benefits, including enhanced crop yields, the provision of wildlife habitat, and the potential for carbon sequestration to address modern climate change challenges (Hergenrader, 2008, p. 4).

Table 1. Development statistics of the Shelterbelt project (1935–1942)

Year / Phase	Key Event / Operational Status	Survival Rate	Achievement & Notes
1934	Executive Order	--	President Roosevelt allocates 1 million \$ for preliminary surveys and seed collection.
1935	Inception & Experimentation	71.5%	First tree planted (Apr 1935). Proven feasibility despite skepticism.
1936	Technical Improvement	73.5%	Improved planting techniques resulted in higher survival rates despite severe drought conditions.
1937	Community Integration	61.5% - 62.0%	Survival rate dipped temporarily as maintenance responsibility was transferred to local farmers/landowners.
1938	Peak Performance Year	~80% (Regional)	The most productive year: 4,266 miles of windbreaks were planted in a single season.
1939	Expansion (Kansas)	--	Significant expansion in Kansas with 6.4 million trees planted in the state.
1942	Project Termination	--	Project concluded due to World War II. Total: ~220 million trees, 18,600 miles planted protecting 30,000 farms.

Source: Prepared by the researcher

Statistically, the two projects represent massive, state-directed investments in ecological infrastructure, though defined by different metrics of scale. The U.S. Shelterbelt Initiative (1934–1942) was characterized by sheer planting volume, deploying over 220 million trees across 30,000 farms to establish a continuous protective zone 100 miles wide (Droze, 1977, p. 72). In comparison, the current rehabilitation of Algeria's Green Dam (2023–2030) is defined by a massive financial capitalization of 75 billion DZD intended to expand the total area to 4.7 million hectares, supported by industrial-scale production from 45 nurseries with a capacity of 120 million seedlings (Benkheira, 2025, p. 8; Ouldache, 2021, p. 15). Regarding biodiversity, the projects diverge in their ecological design. While the American windbreaks were primarily engineered for soil stabilization—which incidentally created wildlife habitats and carbon sinks (Brandle et al., 2004, p. 72)—the Green Dam's modern phase explicitly prioritizes botanical diversity to correct past failures. Moving away from the vulnerability of Aleppo pine monocultures, recent assessments in Djelfa have cataloged 109 plant species, with a strategic pivot toward planting fruit trees and indigenous drought-resistant varieties to build resilience against invasive pests and climate stress (Bourahla & Boukherouba, 2024, p. 4; Orabi et al., 2025, p. 1812).

11. Green Dam and the Shelterbelt Initiative Role in Green Job Creation and Sustainable Development

11.1. The Green Dam Project

Green job creation is used as a practical indicator to assess whether the Green Dam's rehabilitation operates as a sustainable development strategy rather than a purely environmental intervention, particularly through infrastructure upgrading and rural economic activities (Orabi et al., 2025, p. 1812). Employment-related outcomes (e.g., field contracts, maintenance work, and restoration-support services) are therefore interpreted as mechanisms that can reinforce local ownership and enhance the durability of restoration gains across the 13 provinces (Orabi et al., 2025, pp. 1812–1813). This perspective is supported by earlier program evidence showing that, during the 1994–2000 “major works” phase, the Green Dam was explicitly linked to economic recovery and job creation alongside anti-desertification actions and the strengthening of forest infrastructure (Rahmani, 2017, pp. 301–302). Moreover, reported socio-economic effects included employment opportunities, improved rural incomes, and reduced isolation through access tracks, combined with livelihood-oriented measures such as fruit plantations, fodder/pastoral improvements, and soil and water conservation interventions (Rahmani, 2017, pp. 301–302). However, the persistence of instability and degradation trends implies that these employment benefits may remain fragile unless governance, monitoring, and long-term maintenance are sustained—hence the need to evaluate green jobs not only by their number but also by continuity and effectiveness (Orabi et al., 2025, pp. 1812–1813).

The rehabilitation and expansion of the Green Dam for the 2023–2026 period fits within an intervention-based approach that combines ecosystem protection with the strengthening of local development, making it a lever for generating “green jobs” with a dual impact: environmental-preventive and socio-economic. These jobs materialize in activities related to forest-fire prevention for the 2024–2025 season through the mobilization of human and material resources,

and by accelerating the implementation of field-based preventive infrastructure (opening access tracks, establishing firebreaks, building lookout towers, and equipping water collection points), thereby enhancing preparedness and response capacity while creating demand for skilled and semi-skilled labor in forest management, logistics, and monitoring. In parallel, the 2024 sectoral development program—allocated more than 8.5 billion dinars—supports additional employment dynamics linked to afforestation, maintenance, soil stabilization, and the reinforcement of local water resources, which are commonly classified as green jobs because they contribute to conserving natural resources and restoring environmental quality. From a long-term strategic perspective, the project aims to increase the Green Dam's area to 4.5 million hectares by 2030, compared to the current 3.4 million hectares, implying a gradual expansion in the scale of environmental activities and associated ecosystem services, and therefore a broader base of green employment opportunities. This trajectory gains a clearer development dimension through the emphasis on involving local small and medium-sized enterprises in implementation works, which can help localize value chains, accelerate project delivery, and convert environmental investment into decent and sustainable jobs, consistent with the literature that links green jobs to improved resource efficiency and reduced environmental degradation while delivering social and economic benefits. (Algerian Ministry of Agriculture and Rural Development, 2023).

11.2. The Shelterbelt Initiative

The global economic crisis triggered by the 1929 crash quickly escalated into a worldwide depression as prices for food and raw materials “fell sharply across the globe after 1929,” worsening the international economic squeeze between industrial exporters and primary product producers (de Bromhead, Fernihough, Lampe, & O'Rourke, 2018, p. 11). In the United States, the New Deal approached this emergency as both an economic and environmental crisis, since the Great Depression interacted with drought and dust storms to intensify displacement and soil loss across the Great Plains (Lowitt, 1976, p. 405). Within this context, President Franklin D. Roosevelt launched the Shelterbelt initiative (later associated with the Prairie States Forestry Project), while the Norris–Doxey Cooperative Farm Forestry Act (1937) supplied a legislative framework that enabled cooperative windbreak planting on privately operated farms (Lowitt, 1976, pp. 405–407). Contemporary accounts also stressed that the program depended on relief financing and WPA certified labor, with the Forest Service working directly with farmers to plant tree strips designed to reduce wind damage, conserve moisture, and protect agricultural livelihoods (Lowitt, 1976, p. 407). Taken together, the Shelterbelt initiative demonstrates how New Deal policy translated a global economic shock into a place based, employment linked conservation intervention aimed at stabilizing production in a region seen as central to national food security (Lowitt, 1976, pp. 407–408; de Bromhead et al., 2018, p. 11).

The Prairie States Forestry Project (PSFP) created a diverse spectrum of employment that extended beyond simple manual labor, encompassing technical, administrative, and logistical roles. Direct field employment primarily utilized workers from the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC) for labor-intensive tasks such as seed collection, nursery management, seedling transportation, and the physical planting of windbreaks (Droze, 1977, p. 248). These roles required specialized training in soil preparation and rodent control to ensure tree survival in the semi-arid Plains environment. Furthermore, the

initiative generated 'green-collar' professional positions, including foresters who designed site-specific planting plans and conservation technicians who monitored ecological outcomes (Snyder, 2021, p. 12). By integrating professional expertise with massive manual labor, the project not only provided immediate economic relief but also institutionalized environmental management as a viable career path in rural America (Orth, 2007, p. 341);

Both the Algeria Green Dam rehabilitation and the Prairie States Forestry Project demonstrate how afforestation initiatives generate employment while advancing sustainable rural development. The American project created stratified employment spanning WPA/CCC relief workers performing planting and nursery operations, specialized technicians managing soil preparation and survival monitoring, and professional foresters designing ecological plans—institutionalizing environmental work as viable career pathway in rural communities. Algeria's rehabilitation similarly produces multi-tiered jobs through field contracts for planting and maintenance, infrastructure roles building access tracks and fire prevention systems, and technical positions, while explicitly targeting youth employment and local enterprise participation to localize value chains from the 8.5 billion dinar sectoral investment. Beyond job creation, the Shelterbelt initiative integrated employment with agricultural livelihood support through windbreak systems that stabilized farm productivity and prevented rural displacement, embedding forestry expertise within farmer cooperatives to enhance long-term resilience. Algeria's approach embeds green jobs within comprehensive development frameworks including improved incomes through fruit plantations and industrial forestry, enhanced pastoral productivity, reduced isolation via access infrastructure, and livelihood diversification in ecotourism and artisanal production. The critical distinction lies in employment durability: the American project delivered concentrated relief work creating permanent infrastructure with limited continuous jobs, while Algeria explicitly evaluates green jobs by continuity and effectiveness, recognizing that sustainable development requires ongoing income opportunities through ecosystem management and resource processing that link rural livelihoods to environmental health across generations.

12. RESULTS AND DISCUSSION

- Results of the Green Dam Project (Algeria)

The project's modern phase (2023–2030) focuses on correcting past errors and ensuring sustainability:

Expansion: Aims to expand the total area to 4.7 million hectares by 2026, supported by a budget of 75 billion DZD.

Biodiversity: A strategic shift away from monoculture (Aleppo pine) toward diverse species, including fruit trees and drought-resistant indigenous varieties, to enhance ecological and economic resilience.

Green Jobs: Focuses on creating sustainable rural livelihoods and involving small enterprises (SMEs) rather than just temporary labor. This integrates economic benefits (fruit plantations) to support local communities.

Challenges: Data from the Djelfa region indicates that forest cover loss (2015–2025) still exceeds reforestation rates, highlighting the urgent need for the current intervention.

- Results of the Shelterbelt Initiative (USA)

This project successfully met its goals as an emergency response to the "Dust Bowl" crisis of the 1930s:

Achievement: Planted over 220 million trees and established 18,600 miles of windbreaks protecting 30,000 farms.

Effectiveness: The windbreaks successfully stabilized soil and improved agricultural productivity, achieving a tree survival rate of approximately 80% by 1938.

Employment: Provided massive employment relief during the Great Depression, though these were primarily emergency roles rather than long-term sustainable development jobs.

The results highlight a fundamental difference in approach:

The U.S. Project was a rapid engineering intervention to save soil during an acute crisis.

The Algerian Project (in its modern version) aims for comprehensive territorial development that integrates environmental protection with long-term economic viability for local populations.

13. CONCLUSION

The study concludes while the U.S. Shelterbelt was an environmental project fundamentally designed to alleviate unemployment triggered by the 1929 economic crisis, the Green Dam was initially established solely to combat desertification using non-fruit-bearing trees.

The Green Dam is evolving into a broader sustainable development strategy. The project's recent rehabilitation highlights the importance of moving beyond simple tree planting to creating 'durable' green jobs and support green entrepreneurship by establishing small and medium-sized enterprises (SMEs) for the exploitation of fruit trees and forest resources. This approach links ecosystem health with long-term rural livelihoods (e.g., ecotourism), emphasizing that successful green infrastructure requires adapting to local socio-economic needs and avoiding ecological monocultures.

This evolution represents a qualitative shift from 'Green Dam 1.0' (traditional) to 'Green Dam 2.0' (smart and sustainable). This transition is further reinforced by the launch of the new AlSat-3A and AlSat-3B satellites (January 2026), which opens horizons for creating highly specialized technical green jobs in vegetation monitoring, satellite image analysis, and early warning systems, thereby moving the project from manual management to precision digital management."

14. Bibliography List :

1. Books:

Droze, W. H. (1977), *Trees, prairies, and people: A history of tree planting in the Plains states*, Texas Woman's University Press, USA;

International Labour Organization (2013), *Sustainable development, decent work and green jobs*, ILO, Geneva, Switzerland;

Snyder, Stephanie A. (2021), *Digitizing the New Deal's Prairie States Forestry Project*, USDA Forest Service - Rocky Mountain Research Station, Fort Collins, Colorado, Volume 1, Number 102;

United Nations Environment Programme (2008), *Green jobs: Towards decent work in a*

sustainable, low-carbon world, UNEP;

World Commission on Environment and Development (1987), *Our common future*, Oxford University Press.

2. Journal articles:

Benkheira, A. (2025), The Green Dam in Algeria: From an ambitious project in 1971 to rehabilitation in 2023, *Journal of Information Systems Engineering and Management*, Belgium, 10(1);

Bourahla, M., & Boukherouba, N. (2024), The role of rehabilitating and restoration of the Green Dam in managing the impact of invasive forest pests in Algeria, *Brazilian Journal of Agriculture and Environmental Research*, Brazil, 7(1);

Bowen, A. (2018), Not all green jobs are created equal: Employment and wage differentials in the US non-farm energy sector, *Energy Economics*, Amsterdam, Volume 71;

Brandle, J. R., Hodges, L., & Zhou, X. H. (2004), Windbreaks in North American agricultural systems, *Agroforestry Systems*, The Netherlands, 61(1);

de Bromhead, A., Fernihough, A., Lampe, M., & O'Rourke, K. H. (2018), The anatomy of a trade collapse: The UK, 1929-33, *Queen's University Centre for Economic History Working Paper Series*, Belfast, No. 18-02;

Hansen, Z. K., & Libecap, G. D. (2004). Small farms, externalities, and the Dust Bowl of the 1930s. *Journal of Political Economy*, 112(3);

Hergenrader, G. L. (2008, August). The shelterbelt project in Nebraska. *National Museum of Forest Service History Newsletter*, 20(3);

Lowitt, R. (1976), Shelterbelts in Nebraska, *Nebraska History*, Lincoln, Vol. 57 No. 3;

Orabi Salem Mohamed; Setti Mhammed; Alouat Mohamed; Chinoune Saad (2025), The Green Dam in Algeria From an Ambitious Project in 1971 to an Environmental Rehabilitation Strategy in 2023, Djelfa Province as a Model, *Journal of Information Systems Engineering and Management*, Vila Nova de Famalicão (Braga), Portugal, Vol. 10, No. 4;

Orth, Joel (2007), The Shelterbelt Project: Cooperative Conservation in the 1930s, *Agricultural History*, Winter Park, Florida, Volume 81, Number 3;

Ouldache, E. H. (2021), Le barrage vert : bilan physique et perspectives, *Annales de Recherche Forestière en Algérie*, Algeria, 8(2);

Rahmani, N. (2017). Stratégie d'adaptation au changement climatique : l'expérience du Barrage vert en Algérie. *Forêt Méditerranéenne*, 38(3).

3. Seminar articles:

Karle, S., Weakly, L., & Bentrup, G. (2021), A cultural landscape archive: Digitizing the New Deal's Prairie States Forestry Project, Paper presented at the Council of Educators in Landscape Architecture Conference, Minneapolis, MN, United States.

4. Theses:

Zehraoui Rabia, Biodiversité et diagnostic phytoécologique de stations du barrage vert en vue de propositions de réhabilitation région de Djelfa, Faculty of Nature and Life Sciences, Ziane Achour University of Djelfa, Algeria, 2023.

5. Internet websites:

Algerian Ministry of Agriculture and Rural Development (2023), Green Dam project and the preparation of the forest-fire prevention and suppression campaign: main topics of the meeting of Mr. Youcef Cherfa, Minister of Agriculture and Rural Development, with forestry officials, web site: <http://madr.gov.dz/2023/12/17/> (consulted on 21/01/2026).

15. Citations: