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In cooperation with



PROJECT
INSPIRED – Agri-PV: Sustainable Use of Agrivoltaics

GLOBAL FUND
Fund for the Promotion of Innovation in Agriculture (i4Ag)

COMMISSIONED BY
Federal Ministry for Economic Cooperation and Development (BMZ)

IMPLEMENTING PARTNER
Fraunhofer Institute for Solar Energy Systems (ISE)

PROJECT REGION
Namibia

DURATION
10/2022 – 03/2027



AS PART OF:



INSPIRED – Agri-PV: Sustainable Use of Agrivoltaics in Namibia

As part of the Special Initiative *Transformation of Agricultural and Food Systems*

THE CHALLENGE

For about 70 % of Namibia's population, agriculture is a direct or indirect source of livelihood, but primary agricultural and forestry production accounts for only 4 % of GDP. Although classified as a middle-income country, food and nutrition security and unemployment are pressing development challenges for Namibia, especially in rural areas. Besides this, the country is strongly affected by climate change. Droughts and floods are becoming more frequent and have detrimental effects on agriculture. Over one third of the population suffers from a high level of acute food insecurity due to severe droughts. Namibia covers around 60 - 70 % of its national electricity demand through costly imports from neighbouring countries. Furthermore, only about 25 % of the rural population has access to electricity and due to the low population density and vastness of Namibia, rural electrification comes at a high price for grid operators and consumers alike. The lack of access to (affordable) electricity leads to low productivity, high crop losses and affects the competitiveness of agriculture, as solar-powered irrigation systems (application of solar-powered borehole pumps), cooling and processing of agricultural products remains a challenge. At the same time, Namibia records more than 300 sunny days per year. Consequently, the country has an enormous solar energy potential to electrify rural areas, to foster local food production and to create employment along green value chains as a driving force for rural transformation.

THE INNOVATION

Agrivoltaics – Combining Agriculture, Livestock and Solar Power Generation

Agriphotovoltaics (Agri-PV), or Agrivoltaics as it is commonly referred to, offer an innovative approach to address the challenges of the water-energy-food nexus in Namibia. It makes an exemplary contribution to the productive use of solar energy for promoting food security, increased productivity, and income in rural areas, including both crop production and livestock systems. Agri-PV systems are highly adaptable and can be designed to meet the needs of local farming communities. While PV modules provide shelter to protect plants and livestock from high radiation and extreme weather events, the solar energy can serve to power a number of processes, such as:

- > irrigation systems;
- > drying and cooling facilities for improved post-harvest handling;
- > processing machinery for on-farm value addition and
- > digitalisation for business and marketing purposes.

In addition to the available electricity for productive use, experiments conducted with Agri-PV in other countries have shown an increase in yields of up to 20 % for certain crops, due to optimised irrigation, shade and soil nutrient conservation.

Methodological Approach and Innovation Partnership

The project is being implemented by the Global Fund for the Promotion of Innovation in Agriculture (i4Ag) in close cooperation with the bilateral Farming for Resilience (F4R) Project,



a joint initiative of GIZ and the Namibian Ministry of Agriculture, Fisheries, Water and Land Reform (MAFWLR). It is being carried out with the Fraunhofer Institute for Solar Energy Systems (ISE), Europe's largest solar research institute. The Fraunhofer ISE Agrivoltaics Group comprises expertise from a variety of disciplines to explore the many aspects of combining agriculture and photovoltaics. The project also involves partnerships with national education and research institutions, in particular with the University of Namibia (UNAM), relevant government institutions in the agricultural and energy sectors, public and private financial institutions, solar energy companies, agricultural cooperatives, (smallholder) farmers and civil society organisations.

The pilot phase of the Agri-PV initiative involves the installation of seven context-adapted Agri-PV demonstration sites accompanied by scientific research in order to generate evidence-based information on the effectiveness and suitability of Agri-PV systems. At the outset and throughout implementation, information sessions, lectures, technical workshops, and specialised training courses are organized for interested farmers, representatives of relevant Government institutions, commercial banks, solar companies, and other industry stakeholders. This inclusive approach aims to promote locally produced Agri-PV systems as an innovative, climate-adapted, and profitable solution for agricultural production in Namibia.

THE OBJECTIVES IN FIGURES

- **7 Agri-PV demonstration systems** are operational
- **20% average productivity** increase
- **80%** of participating smallholders **improve their income**
- **1,500 people** participate in Agri-PV-related trainings or information events

The project contributes to the achievement of the following Sustainable Development Goals (SDGs):



IMPORTANT ACTIVITIES

- Installation of 7 Agri-PV demonstration systems adapted to the local context.
- Cooperation with local research institutes for data collection and analysis.
- Conducting practical training courses on Agri-PV with researchers, teachers and students as well as policy makers, entrepreneurs and farmers.
- Awareness-raising about the potential of Agri-PV through events and publications.
- Organising and participating in cross-border exchange programmes to promote South-South cooperation

THE MAIN OBJECTIVE

Increasing food security, productivity, and income in rural areas through Agri-PV, a climate resilient technology.

Sustainability and Scaling Strategy

The project is centered around several key components to ensure sustainable impact and stimulate demand for Agri-PV technology. It focuses on raising awareness and providing targeted training measures across crop and livestock systems. Collaborations with national education and research institutions are vital as knowledge multipliers. The project emphasizes adapting Agri-PV technology to local conditions and specific user needs, with special attention to women and youth. Developing viable business models is crucial to attract investors and engage solar industry companies and associations. Sensitizing relevant government institutions is another strategy to ensure long-term success. By implementing Agri-PV in various agro-climatic zones across Namibia and testing different crop, livestock and PV system designs, the initiative aims to generate practical, evidence-based insights. At the same time, cross-country exchange on Agri-PV is strengthened to foster knowledge sharing and replication. These outcomes will support the scaling of locally produced Agri-PV systems of different sizes.

Published by German Federal Ministry for Economic Cooperation and Development (BMZ)

As at March 2026

Author / Contact: Elke Peiler / Tino Hess
Photo credit: © GIZ
Design / Layout: Atelier Löwentor, Darmstadt, Germany

Implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
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