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POSITIONING NAMIBIA'S CROP SECTOR TO MAXIMISE BENEFITS FROM THE DEVELOPMENT OF THE GREEN HYDROGEN INDUSTRY

Executive summary – Key messages

- Namibia's crop sector is faced with persistent challenges such as poor rainfall, limited irrigation, low productivity, and high input costs
- National policies such as Vision 2023 and the National Development Plans (NDPs), specifically NDP-6, recognise agriculture as a priority sector and the critical need to promote crop value chain development and agro-processing
- The emerging Green Hydrogen (GH2) industry, supported by international partnerships (EU, Germany), positions Namibia as a renewable energy hub, with potential benefits for the agricultural sector
- Despite these developments, policy and regulatory gaps exist in terms of the lack of integration between the GH2 programme and the Ministry of Agriculture, Forestry, Water and Land Reform (MAFWLR), the lack of deliberate inclusion of farmers in the GH2 benefits, and the absence of incentives or mandates to prioritise local fertiliser supply
- This is besides the fact that Namibia's crop sector currently has minimal renewable energy use, relying mostly on non-renewable energy sources (oil, diesel, etc.); thus, the sector is vulnerable to global supply shocks (i.e., inflation, Russia-Ukraine, Iran-Israel-US conflicts, etc.)
- The strategic integration of GH2 with agriculture offers major opportunities like domestic green ammonia fertiliser production, affordable clean energy for irrigation and value addition, access to premium export markets for low-carbon produced products, local job creation, and a strengthened crop value chain
- To avoid missing an opportunity that comes with GH2, policy actions such as developing an Agricultural Green Hydrogen Beneficiation Strategy (AGHBS), providing incentives for local green ammonia fertiliser production and usage, investing in Research and Development, subsidising green energy-powered irrigation, and developing a branding or certification for "Green crop" to boost competitiveness, should be considered

1 Introduction and background

Various challenges such as poor rainfall patterns, limited irrigation infrastructure, low productivity, and high input costs continue to seriously impact Namibia's crop sector. However, national policies and strategies such as Vision 2030 and the National Development Plans (NDPs) support the country by advocating improvements in the crop sector through various project implementations. For instance, the recently launched sixth National Development Plan (NDP-6) emphasises various strategies aimed at enhancing the agricultural sector, and those specific to crops are: the crop value chain development initiatives and the agro-processing development goals. The same document also refers to establishing the Green Hydrogen Industry, which, beyond job creation, includes producing green ammonia that could benefit Namibia's crop industry (National Planning Commission, 2025).

Recently, news of the development of Namibia's Green Hydrogen (GH₂) Industry has gained both national and international attention. The Government's push for GH₂ production, supported by international and strategic partnerships with the European Union (EU) and Germany, has positioned Namibia as a future hub for renewable energy. For instance, specifically in the crop sector, the GH₂ programme has established the Daures Green Hydrogen Village, which has secured funding to produce green ammonia for fertiliser synthesis, which is expected to cover one-third of Namibia's fertiliser needs (Namibia Green Hydrogen Programme, 2025).

The project is also currently producing various vegetables using state-of-the-art hydroponic greenhouses (Daures Green Hydrogen Village, 2025). However, despite all these new developments in the green hydrogen industry, some of which align well with the improvement of the crop sector, there is a policy and regulatory gap in fully aligning the benefits with agricultural development, particularly the crop sector. The continuous absence of deliberate integration and collaborative strategies, especially from the corresponding institutions, i.e., the Ministry of Agriculture, Fisheries, Water and Land Reform (MAFWLR), the Environmental Investment Fund (EIF), etc., may indicate a missed opportunity related to clean energy access, green fertiliser production, job creation in the crop sector and climate-smart agriculture.

This policy brief emphasises the current status of green energy use in Namibia in relation to the crop sector, policy gaps in aligning the crop sector with Namibia's fast-developing green hydrogen industry, and possible opportunities for the crop sector to benefit from this industry from a national policy perspective. The overall aim is to holistically address challenges such as limited arable land, climate change impacts, and heavy reliance on fertiliser imports to transform the crop sector and improve the country's food security through sustainable, ecologically friendly farming methods.

2 Current status of green energy usage in Namibia in relation to the crop sector

National energy use in the crop sector is currently minimal, with few commercial farmers using solar-powered irrigation systems and some relying on the national grid, which is very costly. Most small-scale farmers manually irrigate their crops or use diesel-powered generators. For fertilisers, the country imports most of its chemical fertilisers because it has no local fertiliser-production industry.

According to the International Energy Agency (IEA) (2022), Namibia's total energy, whether locally produced or imported, was mainly sourced or transformed (into fuels or electricity) from fossil fuels (60% oil) and biofuels and waste (33%).

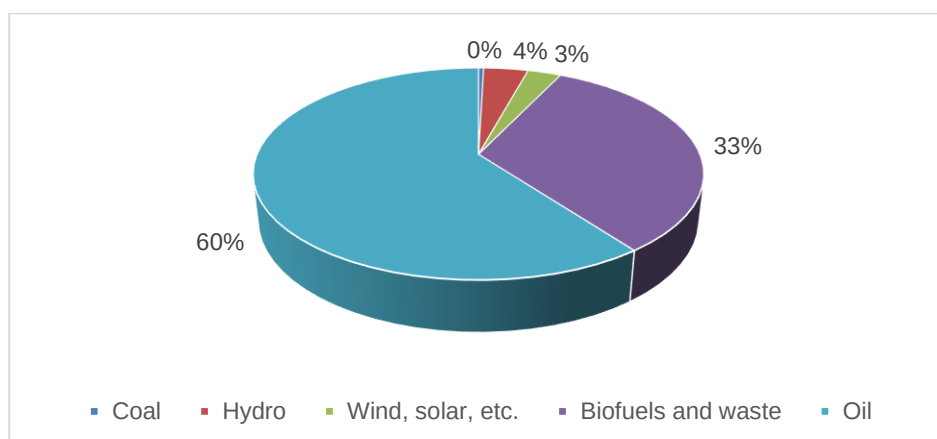


Figure 1: Total energy supply in Namibia, 2022 (Source: International Energy Agency, IEA, 2025)

Because the country does not produce oil, the largest energy source, nor does it produce domestic fertiliser, the crop sector is also directly exposed to international price shocks and supply chain disruptions (i.e., inflation, Russia-Ukraine, Iran-Israel-US conflict). These disruptions directly impact food production costs and food security. The current emphasis on green hydrogen production focuses more on energy export and industrial development, with limited focus on local use, especially in the agricultural sector.

While recent investments in local ammonia sulphate fertiliser production, targeting about 400 tonnes at the start of production, have been reported and could potentially greatly benefit the crop industry (Daures Green Hydrogen Village, 2025), government policy obligations remain lacking. In terms of these new developments in local green hydrogen production, it is imperative that the country, and specifically the crop sector, positions itself to tap into this potential renewable source of energy and fertiliser production to ease the pressure.

3 Potential benefits of green hydrogen for the Namibian crop sector

Given good integration and policy alignment, the Namibian crop sector has an opportunity to benefit from the green hydrogen developments in various ways, such as those below:

- ✓ **Domestic green fertiliser (ammonia) production:** As already established at the Daures Green Hydrogen Village, there is an opportunity for Namibia to benefit from the locally produced nitrogen-based fertilisers (i.e., urea, ammonium nitrate), which are essential for crop production, hence reducing dependency on imported fertilisers and also protecting Namibian crop farmers from global price changes of fertilisers.
- ✓ **Access to clean energy for irrigation and processing:** As green hydrogen is a renewable energy source with a low carbon footprint, this energy can be extended to power the irrigation systems and processing/value-addition facilities. This could mean access to affordable clean energy, whilst increasing productivity and reducing post-harvest losses.
- ✓ **Enhanced soil health:** The use of hydrogen-rich water for soil irrigation has the potential to increase nutrient absorption, improve soil micro-organisms' activities and therefore overall improve crop yields and soil fertility (Ivanova, 2024).
- ✓ **Access to premium export markets:** Crops produced using green hydrogen fertiliser or energy could be branded as having a low carbon footprint or produced via climate-smart technologies, which could attract access to premium international markets, especially those with strict carbon standards. This could also add value to various horticultural products produced in Namibia, therefore benefiting Namibian farmers.
- ✓ **Local job creation and improved value chain:** The green hydrogen industry has the potential to create employment and training opportunities not only in the crop field itself but also in fertiliser plants, logistics, distribution, and advisory services for sustainable green energy or fertiliser uses. It also promotes investment in the value chain, i.e., agro-processing.

4 Possible crop-related policy gaps concerning the Green Hydrogen sector in Namibia

Current national strategies and policy frameworks for green hydrogen are overwhelmingly oriented toward export markets and large-scale economic development, as seen in the Green Hydrogen and Derivatives Strategy (Ministry of Mines and Energy, 2022). While these are significant national goals, a major policy gap remains in intentionally integrating this green hydrogen industry into strategic sectors like agriculture, particularly the crop sector, thereby creating a risk of missed opportunities. These gaps may be summarised as follows:

- ✓ **Policy misalignment and isolated planning:** Currently, the green hydrogen programme is being spearheaded by the Office of the President in close collaboration with the Ministry of Mines and Energy and the Environmental Investment Fund, with no clear legislative mandate. No integration mechanism exists between these institutions and the Ministry of Agriculture, Forestry, Water and Land Reform (MAFWLR), the custodian of most policies related to agricultural development. Furthermore, the current agricultural policies do not yet advocate for hydrogen-based solutions such as green ammonia fertilisers or hydrogen-powered irrigation systems that could benefit the crop sector.

- ✓ **Exclusion of smallholder farmers:** There is no deliberate policy planning for smallholder farmers to directly benefit from the green hydrogen developments, as the current focus is on large-scale (high energy-intensive) industries (i.e., mining, transport), with minimal focus on the crop sector.
- ✓ **Lack of incentives and mandate for local usage:** Although domestic ammonia fertiliser production and usage are being mentioned and investment is ongoing, there are no policy incentives or mandates for the green hydrogen fertiliser producers to allocate a fraction of their output for local usage within Namibia, therefore representing a missed opportunity for national food security.

5 Conclusion

The emerging green hydrogen industry has high potential to transform Namibia's crop sector, especially by driving sustainable food security and competing in export markets for crop products. The absence of deliberate policies to support this potential may, however, limit it or risk leaving the crop sector out of the national green energy transition. Strategic integration is therefore imperative to ensure that crop farmers, whether small-scale or large-scale, directly benefit from green hydrogen-related developments and contribute to the country's food security and economic growth. Policy interventions must begin now, while the green hydrogen industry is still in its development stage, so that all processes align and complement each other as the industry grows.

6 Policy recommendations

Given the obvious opportunities that may arise from the green hydrogen industry that will benefit the crop sector, as highlighted in the sections above, and the lack of policy integration thereof, the following recommendations are made;

- a) **Develop an Agricultural Green Hydrogen Beneficiation Strategy (AGHBS):** Task the MAFWLR together with the Namibia Green Hydrogen Programme, as well as relevant stakeholders, to develop a framework that will align the green energy with the agriculture sector. This includes frameworks on input subsidies (i.e., towards locally produced green ammonia) and mandating a certain percentage of all green ammonia produced in Namibia for allocation to domestic use, with a specific percentage for crop production/agro-processing.
- b) **Provide incentives for local green fertiliser production and usage:** The Government, through the Ministry of Finance, should consider tax incentives to attract more investors who will build more green fertiliser production facilities near the major hydrogen production hubs. Consideration should also be made for subsidising locally produced green hydrogen-based fertilisers, especially for small-scale farmers.
- c) **Invest in research and development:** The recently available scholarship opportunities for youth in the green hydrogen programme have focused more on the Technical and Vocational

Education and Training (TVET) courses, such as welding, boiler making, electrical engineering, etc. While these may be interrelated with agriculture, more funding is needed for crop research, such as the optimal application of green fertilisers for local soils and crops to ensure maximum efficiency and benefits.

- d) **Subsidise green energy-powered systems:** The MAFWLR should develop incentives for farmers who adopt the use of irrigation systems and technologies that are powered by hydrogen-based energy.
- e) **Develop a branding or certification for “Green crops” to boost competitiveness:** The MAFWLR, together with the NAB, should collaborate with various institutions to develop a certification scheme for crop products grown with green inputs to enhance their market value, especially for international markets.

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