VIENNA ENERGY FORUM-THE VEF VIRTUAL SERIES

Sustainable Energy and Food Systems-Session 1

OPPORTUNITIES FOR ENERGY/AGRICULTURE NEXUS INTERVENTIONS

1. INTRODUCTION

In preparation for the 2021 Vienna Energy Forum (VEF), UNIDO and the VEF founding partners launched an online schedule of events entitled 'the VEF Virtual Series'. The purpose of the series is to discuss the role of sustainable energy and innovation in driving recovery in three sectors, namely industry, products and food systems. The Virtual Series brings together selected representatives from private sector, academia, think tanks, NGOs, CSOs and Governments to consider key issues related to each theme.

The first virtual session of Sustainable Energy and Food Systems brought together 36 experts who shared their knowledge, lessons learnt and proposed actions to identify and develop opportunities to advance the energy/food systems nexus interventions.
The session commenced with a welcome and introductions from Ms. Leena Srivastavia (IIASA) on behalf of the VEF founding partners and Mr. Olivier Dubois on behalf of (FAO) as the partner of the track. Tareq Emtairah, Director of the Energy Department at UNIDO explained the motivation behind the initiative, the objectives, and the format of discussions.

This was followed by a presentation of the discussion paper from Dean Cooper, Energy Lead at Practical Action. The presentation outlined the key barriers for progress and some of the opportunities for energy to drive the food system from farm level to agri-business production. The presentation also described the methodology for classification of countries with a high potential impact for pursuing the energy/food system nexus.

The experts then joined discussions in four breakout sessions chaired by the moderators; Harish Hande (SELCO Foundation, India), Denise Umubyeyi (Practical Action, Rwanda), Minoru Takada (UNDESA, US) and Ute Collier (Practical Action, UK). The conclusions were then presented at the plenary.

2. FOCUS FOR DISCUSSION

Today's food systems contribute to increased environmental degradation and the emission of greenhouse gases, hence, the approach towards clean energy access and efficient supply food systems poses a significant environmental benefit. Prioritising the link between energy and agriculture, introduces a move towards the productive use of energy, which can enable sustainable improvements to living conditions and livelihoods.

The discussion centred on the following main questions:

- What data is available to identify which countries offer most potential for sustainable energy in agriculture?
- Which are the most important enabling conditions to allow effective interventions on sustainable energy in food systems?
- How can positive outcomes related to the integration of sustainable energy into agriculture be best demonstrated and disseminated, both in and between countries?

The participants recognized that there is currently an urgent need and a unique opportunity to tackle these issues. The impact of the coronavirus pandemic has led to calls from all sectors to 'build back better' and develop more resilient food systems, as well as further invest in the energy transition. This narrative has the support of many public, private and multilateral organizations. In addition, the high-level energy dialogue (planned in September 2021) and the climate change forum COP 26 (now scheduled for November 2021) will be an opportunity for UNIDO and other key organizations to galvanise new commitments and actions, with increased urgency given the coronavirus-induced delays and short time remaining to achieve the climate and sustainable development goals.

3. SUMMARY OF DISCUSSIONS

The speakers discussed the challenges and opportunities related to each of the three themes and shared their recommendations towards better alignment between the energy and agriculture sectors to accelerate the sustainable development in the target countries.
The section below provides a summary of the main discussion points and take-aways.

3.1 DATA AND EVIDENCE

CHALLENGES

Quality and availability of data: Developing countries have a lack of data to facilitate effective planning – as a result, developers have to invest in data collection & often accept higher margins of error. Farmers associations in developing countries may not have sufficient data. Available online data may not be useful, not reflecting the actual situation on the ground. The data which are available are not specific enough to target locations.

Type of data: There is a need to clarify what type of data is required; this includes details of data gaps and what is needed to measure the market potential for the RE/EE technology solutions in food production. There is currently no clarity on what markets and products already exist.

Complexity of data needed: The data for productive use of energy within agriculture is particularly complex, for instance it involves data sets from multiple stages of a value chains. Value chains may present a more useful focus for data collection.

OPPORTUNITIES

Drive private sector investment: Effective data collection can drive private sector investment, since this addresses uncertainty and hence reduces perceived investment risk. Data collection therefore needs particular focus, especially early-on (this also enables the necessary coordination with government regulations & policies).

Build on existing data: The data available from EPRI and FAO; Power for Africa work on data for crop cover, transport routes, weather systems, least cost energy projections. Some national data can help planning, (e.g. ESMAP bioenergy assessments, IRENA country renewable assessments), some of which focus on agricultural sector. There is related data in GEF for some areas from existing projects (e.g. solar power irrigation). In addition, some data is available for food exporting countries in their export data sources.

Proxies instead of data: Proxies can be used where data is absent. For instance, the data on the amount of diesel use for electricity generation can indicate where are the off-grid areas and the clients in need of sustainable energy supply. Where food losses are great, energy needs are greatest, providing opportunities for mini-grids. Food losses can be an indicator for facilitating investments. Other useful indicators for data provision are electricity access (and RE share), IT access (mobile phone and internet access). These indicators are critical to identify the areas with greatest potential.

Analyse gaps for opportunities: Agriculture value chain gap analysis is a critical requirement and can demonstrate the opportunity for intervention with great potential impact.

New technologies: Industry 4.0 technologies such as drones can provide new opportunities to collect data in the field.

Schools in rural areas can be used as innovation hubs and knowledge sharing centres (e.g. for clean cooking) on productive uses of energy. WFP is developing a programme on this.

3.2 ENABLING CONDITIONS

CHALLENGES

Barriers on technology application: Need to consider all the underlying technology options since there is a specific set of barriers for each application (e.g. mini-grids, energy storage, electric charging infrastructure).

Farmers operating in isolation: Agriculture in developing countries is often structured in a way that farmers operate in isolation. However, they need links to the other players in the value chain (e.g. millers, processors, and connections to markets).

Food price volatility: The current volatility of usage trends reflecting on the investment environment.

Income generation with affordable services: There is a need to help utilities and electricity value chains companies to generate income. At the same time affordability of the service is key to driving demand. Mini-grid users should be able to pay for the service they have. Devaluation of currency can make repayments problematic.

Government policies should not distort the markets. Subsidies can disrupt the role of private developers. Tariff policies for mini-grids need to reflect real costs (not based on grid tariffs, which are usually subsidised).

Access to finance: Farmers in developing countries need access to finance. PPPs may be needed for supply of appliances and machinery.

Meeting the complete energy demand: Most energy applications in remote areas are stand-alone systems, that are often not sufficient to meet all the energy demand in the different stages of the process (e.g. refrigeration) which is key in remote communities.

Management of cold chains: Significant food waste occurs during transportation and storage processes (e.g. in Sri Lanka) which result in economic loss. Better management of cold chains is crucial especially in warm developing countries.

OPPORTUNITIES

Circular economy and food waste: Food waste can be used as a feedstock in circular economy applications, with bioenergy (biogas, syngas) in this area generated from turning food waste into energy. There is an enormous emissions reductions potential from waste reduction. There is a significant interest from Pacific Islands in circular economy.

Learn and share the knowledge: Identify beef, dairy, and fish value chains in Africa and consider how can distributed RE be included, and how to accelerate energy access (link with SACREEE). Engage and learn from countries with relevant experience e.g. Uganda.

Government support: Capacity building programmes and marketing schemes for producers help farmers to promote and sell their produce.

Policies: Smart government policies that provides fiscal incentives for developers (e.g. duty exemptions) can help lower cost, attract international companies, and make it easier to promote investment.

Technology intervention: Farmers can make use of modern agri-tech (e.g. drones to disperse seeds). Start-ups present opportunities to introduce new technology (e.g. energy efficiency, circular economy models). Bioenergy (bio-digesters and biogas utilization) interventions are scalable, technologies are accessible, and farmers are benefitting utilising the organic fertilizer.

Technology innovation to redesign appliances that are used for processes in rural areas to run on RE; also to improve local farming and water supply using RE (e.g. powering climate control agriculture facilities and water desalinizers in UAE).

Potential for replacing fossil fuels: Easy wins possible by replacing diesel powered generators already serving a vibrant productive use sector with renewable energy. It does not require development of productive use sector – it is already there.

Digitalization is critical to access and reach market information (e.g. improved enabling conditions in Sri Lanka).

Youth can play a significant role to ensure access to appropriate energy for all (the objective of SDG 7). The SDG7 Youth Group is interested to facilitate this involvement of young people. **Health nexus:** Energy is related to healthcare benefits (e.g. improved access to fruit & vegetables) which provides a good motivator.

3.3 GLOBAL PERSPECTVIES

In addition to the three key issues considered above, other factors were identified that related to the overriding theme of strategies required to demonstrate that energy in food systems can bring transformational development outcomes.

CHALLENGES

Varying conditions: Low-carbon transition barriers and enabling conditions vary between different countries. No recipe to fit all.

Lack of partnership: Agriculture and energy stakeholders operate in silos. There is a lack of cross-sector cooperation in countries and between countries. There is a need to address and balance the different perspectives of energy and agriculture stakeholders, who see food production processes according to their own frames of reference (conversion of agricultural products vs energy to drive the processes).

OPPORTUNITIES

Value chain approach: Consider the impact of appropriate energy solutions food system in the whole food value chain. This initiative brings an interesting new perspective.

Not only rural communities that have needs – there is also potential for improved efficiency of grid-connected food systems/appliances.

Access to energy can stimulate food production thus increases the food and water security.

4. RECOMMENDED ACTIONS

On the basis of the discussions held during this session, the following recommendations were proposed to address the three key issues, and the broader theme:

4.1 DATA

1. **Collect and analyse all data already available** that is relevant to agriculture & energy, and present in a structured format to allow better access. Look to overlay data sets in target locations to clarify needs and opportunities for energy to improve food systems
2. **Identify ways to improve access and availability of data.** In prioritizing interventions, it is important to consider disaggregated data at the sub-national level to ensure no one is left behind. (1)
3. **Promote open access to data** at various levels. Identify ways on how to improve the accessibility to available data and deliver recommendations on its benefits.
4. **Further develop country selection** methodology taking into account data available at UNIDO and enrich it with the data from other sources. Better data on a disaggregated level should be mapped, and a ranking system should be developed/adopted.
5. **Enhance overlaying data sets** on power and agriculture (e.g. transportation routes, weather systems, climate projections, and infrastructure projections) to provide an understanding of exactly what are the agriculture need

4.2 ENABLING ENVIRONMENT

1. **Work with governments in developing supportive policies** to foster decentralised solutions such as electrification through off-grid and mini-grids.
2. **Ensure co-ordination between different government institutions.** The approaches are often scattered and not integrated. Encourage meetings of ministers responsible for water, food and energy. Policy consistency/coherence is critical for investors. Involve civil society.
3. **Provide technical assistance** on capacity building and development of innovative business models. **Empower mini-grid operators** on the linkages between energy and agriculture. Survey farmers' needs at the beginning of the development phase for mini grids (e.g. Rwanda, Madagascar)
4. **Demonstrate the use of mini-grids** for productive use of energy (e.g. agriculture processing). Innovative yet implementable solutions required on the ground

(1) Power for All policy brief which covers these topics (with focus on East Africa): www.saiia.org.za/research/powering-agriculture-unlocking-africas-next-green-revolution/

5. Introduce a whole suite of complementary interventions **focusing at the value chain** – from the farms to the market. Take the range of established work (e.g. finance mechanisms) and apply it to the other actors in the food system value chain.
6. **Engage with the rural electrification agencies** to share experience and knowledge and improve the electrification planning considering needs for food system value chains
7. **Integrate technology and finance** to acquire all services to harvest and sell to the market. Target to improve access to financing through models like PPPs for appliances, machinery, and PAYGO systems etc.
8. **Consider the potential of strengthened cold storage** infrastructure to generate climate benefits, reduce food losses and improve competitiveness;

4.3 OUTREACH

1. Launch **promotional campaigns** to raise awareness. Facilitate partnership with governments, donors, farmers and media. **Political leadership** is important to promote RE use in agriculture value chains
2. Consider how to promote and demonstrate the benefits of **circular economy approach**
3. **Facilitate coordination and knowledge sharing** among countries
4. Look for opportunities to demonstrate the food/energy health nexus in the **Pacific Islands**. Use 24hr mini-grids for refrigeration and security. Also, for productive use (people grow own food in own secured gardens)

4.4 CROSS-CUTTING ISSUES

1. Guiding principle should be how to **maximize emission reductions.** Consider cost per tonne of GHG abatement for each relevant technology.
2. UNIDO has a niche and focus only in particular areas and it requires effective **collaborative action** with relevant stakeholders
3. **Land and water nexus:** Energy is crucial for food processing but the land and water nexus should always be taken into consideration.
4. **Country selection** should be focused on those that have the potential for development at the lowest possible cost. Later, look at the underlying costs that this would bring. However, do not limit the focus on countries where economic impact is expected to be quickly achieved at scale. Also consider countries where people's needs are currently higher but larger economic impact might take longer to realise.