



# VIENNA ENERGY FORUM-THE VEF VIRTUAL SERIES

## Sustainable Energy and Food Systems-Session 3



### 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. Rana Ghoneim (UNIDO) on behalf of the VEF founding partners. Ms. Rana Ghoneim explained the motivation behind the initiative, the objectives, and the format of discussions.

This was followed by a scene-setting presentation of Merjin Havinga, from SNV. The presentation outlined the opportunities of productive uses of energy (PUE) in different stages of the agricultural value chain. PUE in agriculture can intensify production, increase food supply, add value to the crops and increase the income by mechanization. The recommended actions for the uptake of PUE are presented as below:

- increase cross-sectoral stakeholder collaboration in particular between energy, agriculture.
- projects should be designed from the nexus perspective and aim at scaling up and market transformation. Project teams should consist of multi-disciplinary experts (e.g. with energy experts and market developers).

The experts then joined discussions in four breakout sessions chaired by the moderators; Mr. William Brent (Power for All), Ms. Monica Maduekwe (ECREEE), Mark Draeck (UNIDO), Ms. Katrin Harvey (Ban-ki moon Center).

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## 2. 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.

### 2.1 GLOBAL PERSPECTIVES

#### QUESTIONS

- Which countries offer the best examples of how to introduce value chain upgrading using sustainable energy?
- What strategies were employed to make this work?
- How can international organisations work together to create a suitable enabling environment for the introduction of sustainable energy to support value chain upgrading?

#### CHALLENGES

##### **Different typologies in countries**

Many countries have different typologies which makes the value chains different from each-other since they depend on the climate. Often, focusing into country level would not be workable, look at through typologies instead. Segment the opportunities in different typologies.

##### **Demand or supply side focus?**

There is an ongoing discussion on the approach whether it should be demand driven or supply side focus? We need to focus much more on the demand side to tackle the challenges the farmers face.

**Technology maturity** is important, some processing applications could be less mature. Targeting specific tested and known technologies (milk chillers etc.) could avoid risks.

Better **donor coordination** at the country level is needed especially in African countries.

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## OPPORTUNITIES

### **The role of private sector**

It is clear that the private sector needs to play a critical role in scaling up productive use of energy in agriculture. But this involvement needs to be without too many market distortions.

### **Holistic or specific approach**

Both approaches are important.

Have a holistic approach: Integrate different systems into all the stages from design phase through implementation phase.

Have a specific approach: Do not look at the country perspective. Focus on specific crop or application

There are **different nodal points for implementing strategies:**

- what is already mechanised and how this can be upgraded easier to impact existing use of energy
- no mechanization, new technologies and efficiency improvement (relatively more difficult), specifically in pre-harvest and harvest
- diversifying and transforming value chain: decentralized, closer to farmers

### **Enhanced partnership**

Exchanging knowledge and sharing best practices will avoid duplicating the efforts. International organizations need to collaborate more on this. All the organizations monitor and evaluate their programs so they have experiences and reports to share.

If there is an opportunity to make money, there is development, international organizations should develop opportunities for this and encourage private sector.

## 2.2 COUNTRY VOICES

The following factors need to be analyzed to guide the energy interventions to support value chain upgrading:

- Actors
- Products
- Economic Aspects
- Market Structure
- Governance
- Linkages
- Resources

All interventions should be examined in a system thinking approach to identified the best solution for the context.

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## QUESTIONS

- What energy interventions and technologies present the most significant transformational opportunities to support value chain upgrading and / or the use of bioenergy derived from agricultural value chains?
- How can value chain upgrading using sustainable energy be used to promote gender equity? Any examples?
- What are the main challenges to the adoption of sustainable energy enabled value chain up-grading (including bioenergy in circular systems) on a large scale?

## CHALLENGES

The main challenges to the adoption of sustainable energy solutions in the food system value chain include:

- In Africa, a large part of the food systems is carried through the informal sector. Families and small holder farms do not conduct their businesses through formal channels. This creates a challenge for the uptake of innovations and improvements of new technologies.
- Food losses and food waste is another great challenge since a lot of the energy input is lost.
- Intervention schemes are badly designed and do not fit within the systems they are implemented in.
- Lack of access to finance to implement sustainable solutions.

**Ethiopia** has a great agricultural potential to commercialize, however, the country lacks the support to operationalize solutions. For example; there is an initiative to create integrated industrial park (rural transformation centers) that aims to integrate the supply and demand of the food chain. The facility is built but so far have not used due to lack of support and favorable federal conditions for increased investment.

In **Uganda** as well as in most sub-Saharan countries, due to historical and cultural issues women have not had the opportunity to be recognized as heirs to their family's property and many lack access to rights to own land due to the historical imbalance. If a financial institution would like to develop a product to provide access to solar irrigation systems, they often find that their lending methodology/approaches require traditional collateral, like land, therefore many women are left out.

## OPPORTUNITIES

Value chain upgrading opportunities at the enterprise level can be categorized as follows:

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UPGRADING OPTION	DESCRIPTION	EXAMPLE ENERGY INTERVENTIONS
Product Upgrading	Commercialization of products with improved performance characteristics.	Solar tunnel drying systems for grains and solar dryers for finished products.
Process Upgrading	Development and implementation of new or significantly improved production or delivery method.	Solar powered cold storage facilities with the use of better insulation, evaporative cooling in subtropical areas for food and vegetables, biofuel or solar technologies for cooking and hot water, and water pumps for irrigation.
Functional Upgrading	Engaging in new or superior activities in the value chains	Leverage solar powered communication technologies to move from component manufacturing to product design
Sectoral Upgrading	Moving to new productive activities or sectors using previously acquired knowledge and skills.	Evaporating cooling devices for the transport of fruit and vegetables
Service or Support Structure Upgrading	Upgrading aspects including machinery and equipment.	Certification and technical assistance.

### Empower women

There are great opportunities to empower women to take up leadership roles within their communities through capacity building and job creation. It is not easy, but you have to put resources in place and capacity building to make the change, and assist and cooperate with all stakeholders, governments and civil society. There are opportunities to provide equitable access to finance for both women and men through innovative finance schemes.

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### **Cost Benefit Analysis**

Investments in food system value chains can be de-risked by conducting a cost benefit analysis that takes into consideration social and environmental aspects. Countries like Tanzania, Kenya, Tunisia and the Philippines have been successful with this approach.

## **2.3 ENABLERS FOR PROGRESS**

- What are the key features of an enabling environment for the large-scale use of bioenergy within agricultural value chain or other upgrading approaches facilitated by sustainable energy?
- What enablers are needed for women to benefit equally from the introduction of sustainable energy enabled value chain up-grading?
- How can finance for the sustainable energy value chain be improved? What good practice examples exist?
- What other enablers are needed to make sustainable energy interventions work within value chains?

### **CHALLENGES**

#### **Assessing all the aspects of sustainability**

When one wants to change energy supply, one must verify how sustainability assessments are made. Usually only one or two (out of four) topics are addressed (i.e., environment, economic and social sustainability) at the same time instead of understanding how they are cross-cutting within each other. Sustainability assessments provide a deeper understanding of the value chain of food systems by modeling the outcomes if specific changes are made in the value chain. Hence, sustainability assessments can provide a clear picture of where a project/technology/value chain stands.

#### **Lack of methodology on social impacts**

Usually, the data on environmental and economic sustainability exists, but on the other hand, social impacts are harder to measure – especially within the food industry/value chain due to the difficulty in measuring the impact e.g. on health and nutrition. Indirect costs of food production within society, which are not visible in the price of a product.

#### **Lack of business models for small farmers**

Business models are based on assumptions of internal rate of return that are based on cash flows that are based on revenues that are based on prices that are based on volumes that are based on access and this access is what is missing. Other times it is practice.

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### **Lack of women representation in energy sector**

Only about 15% of the occupations within the energy and environment sector are occupied by women led start-ups. Only 13% of women are new founders in terms of clean energy enterprises.

### *OPPORTUNITIES*

The opportunities to enable progress in food system value chains can be listed as below:

- Capacity building and technical assistant do not get sufficient investment. Raising awareness on renewable energies in terms of productivity and income increase – not many families and small businesses are aware of renewable energies benefits.
- For small farmers that might be reluctant to adopt RE: Organizing demonstrations for cooperative through extension services and green innovation services
- Launching clean energy enterprises at a local capacity.
- Having guarantee funds could lead to moving from low to a higher tier energy access.
- Focus on innovating business models and digitization in the sector.
- Result based financing mechanisms could provide solutions.
- Launching clean energy enterprises, especially with local capacities.
- Partnering up with universities, research labs, and start-ups.
- Building productive energy into the next round by creating booster values for energy services that have energy appliances attached to them.

### *SUCCESS STORIES*

**GIZ** identifies the key energy needs (i.e., heating and electricity) within agri-value chain to then work with the private sector (e.g., distributors, productive use of energy appliances) to enter the market and support the farmers. EnDev (Energising Development)/GIZ have a program called Fast Track Support that mainly targets off-grid companies but not towards productive use sectors because the household energy access ecosystem is too big.

### **New Energy Nexus**

Kenya: New energy nexus supports startups such as Powerhive: Develops scalable, bankable off-grid utility solutions to create a future where everyone has access to clean energy and the opportunities that come with it. Powerhive is Kenya's first private electricity provider.

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Uganda: New Energy Nexus has a programme called Inventure which works with community-based organizations they provide financing in the form stock and/or loans (around 500USD). The stock sold consist of solar lanterns, clean energy fuel briquettes, environmental water filters to people who not have access to energy. The programme trains beneficiaries on renewable energy and clean entrepreneurship. Their impact analysis has found that by training women (70% of the beneficiaries) on clean energy and energy entrepreneurship, jobs can be created.

## 2.4 DATA AND EVIDENCE

In general, there are 3 ways sustainable energy investment can happen in agro-sector:

1. Stakeholders have benefit (the revenues will be improved) (push system)
2. Consumer demands it (demand stimulation through capacity building, industry awareness and data sharing)
3. Government support and policy incentives

### QUESTIONS

- How can investment in sustainable energy especially in value chains be increased? What are the opportunities/challenges for this? What is holding this back? What strategies can be applied to address this?
- What data is needed to assess the potential of sustainable energy to support value chain up-grading within a particular country? What is missing to make the right decision in terms of data?
- Are there any specific data gaps that hinder the de-risking of finance? Is this data freely available – if not what support would enable this data to be in place?

### CHALLENGES

#### **Informal economy**

A portion of agro-businesses operate outside of formal economy. Market research and relevant data may not reflect these informal businesses. There are limitations to collateral-based financing in agriculture.

#### **Assessing the demand growth**

Considering the impacts of climate change, assessing the demand growth in the connection between energy and food systems is important for value chain upgrading. However, predicting the demand growth is difficult due to lack of sub-national level, disaggregated data in the energy sector.

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**Lacking data hinders the interest of investors to fund the investments.**

Nexus approach in data is missing, the data from agriculture and energy sector do merge into: data related to investment flows in the agricultural sectors. Even though the country level macro information (e.g. energy potential in agriculture) is available in most countries, there are significant data gaps on intervention-level.

Required data sets are big.

Private sector provisioners tend not to share the data, understandably.

**Primary data collection needs due to data gaps.**

Why are the data gaps? Large part of agriculture value chain are part of the informal market. Official data provided by the government agencies may not be up to date (for instance after weather). Available data are often unstructured which makes it time-consuming to analyze. Different actors collecting data without interreacting with each other.

Large **fossil-fuel subsidies** in agriculture particularly in developing countries still in place.

Most of the investment in the energy sector **targets households**, not business or livelihoods due to their higher potential.

## OPPORTUNITIES

**De-risking with risk assessment**

De-risking for finance providers by demonstrating that the technology has business case and assessing and taking into account of all the risks. Take into consideration of behavioral dimension social risks (such as risk of social exclusion or not having an impact. Consider the unintended negative impacts for instance water, for instance solar pumps which run free can deplete underground water resources.

**Make use of public research**

Many countries have public-funded agricultural research departments; however, these funds are not used for assessing energy constraints of farms. Public funded research can identify the areas and markets which are neglected.

Besides energy supply **biogas systems** in agricultural applications can provide bio-fertilizer as a by-product that is a win-win solution.

The **data on the sustainable energy technologies** and their social and environmental impacts are well documented and available.

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## 3. RECOMMENDED ACTIONS

### 3.1 GLOBAL PERSPECTIVES

- The PUE approach should consider all the stages along the entire value chain from seeding to post-harvest. Different products required different amount of energy - putting more energy into packaging may reduce energy in the entire value chain (e.g. cold chain)
- Take into consideration that there are different energy applications for different crops in different time and seasons. Various pre-treatment and processing might be required for these applications.
- Form up national level platforms which connect stakeholders together (building consensus)
- Be well-aware on the baseline situation in the countries and start with better stakeholder coordination at design

### 3.2 COUNTRY VOICES

- Using a holistic/system thinking approach to identify issues. Specificities at a country level must anchor the solutions which need to be differentiated at local level. Furthermore, cities are important actors for integrated dialogues.
- Having organized and integrated planning that help to create local networks and strong utilities to manage water and electricity. Example: The Commission Ireland creates innovation partnerships for environmental issues that are driven from the ground up.
- Introducing voluntary certification schemes to allow producers to differentiate themselves by their use of water/energy, and find alternatives that help capture value.
- De-risking investments in food system value chains by conducting Cost Benefit Analysis that take into consideration social and environmental aspects. Example Countries like Tanzania, Kenya, Tunisia and the Philippines have been successful with this approach.

### 3.3 ENABLERS FOR PROGRESS

- It is essential to have more RE in food value chains and using market-based approaches to achieve food security. Start with commodities that attract more money than others (e.g. solar water pumping).
  - Resource based financing can be a tool to support the deployment of technologies.
  - Standardization and quality control of appliances to make sure that they comply with minimum quality standards.
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- Regulatory framework: getting together the public and private sector, governments, cooperatives, think tanks, academia etc., at least once per year to discuss how to get a strong regulatory framework.
  - Develop women in energy-entrepreneurship programmes. Focus on women energy access enterprises. An increased focus on women will led to greater social impacts.
  - Develop ways to monitor energy use remotely (e.g, with sensors).
  - Partnering up with start-ups and entrepreneurs who focus on the innovation of productive use and support them through accelerators and grants.
  - Focus on material utilization (as it is part of bioeconomy) and determine where it is most useful (i.e., biotech or food for feed). In the first approaches to bioeconomy, the use of energy crops was strongly recommended, which led to a food vs fuel competition that could result in potential strong social problems. There should not be a distortion on the use of biowaste (e.g., W2E) if it is utilized in other more useful purposes (e.g., animal feed, growing insects on biowaste instead of using it for heat and/or power generation).

### 3.4 DATA AND EVIDENCE

- To tackle the financial barrier,
    - translate data into the language that the investors speak (rate of return, risks, how to de-risk, market growth).
    - work with banks directly to make sure that they provide the financing for sustainable energy investments.
    - consider starting with loan guarantee scheme, make sure that complementary investments alongside the direct technology investments.
  - Identify the players in the value chain and conduct surveys to collect the missing data. Besides production data, look at other data sources such as post-harvest lost and compliance.
  - Production and solution design have to reflect the ability and willingness to pay of end-users
  - The data (e.g. performance indicators, risks) on the sustainable technologies should be made accessible to non-energy experts so that value-chain practitioners can integrate into their work.
  - Consider moral aspects of the data (such as privacy, ownership). Ensure the individuals' rights are protected.
  - To be more efficient in terms of data collection:
    - Integrate collaborative measures in the planning phase of data collection. Setting up collaborative data collection modality is crucial to avoid duplication, using different data sources for verification.
    - Balance the cost of the data and the value of the data.
    - Standardize the methodologies and the available secondary data
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