



VIENNA ENERGY FORUM-THE VEF VIRTUAL SERIES

Sustainable Energy and Food Systems-Session 2



PRIORITIES AT THE FARM LEVEL

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 Mr. Alois Mhlanga (UNIDO) on behalf of the VEF founding partners. Mr. Alois Mhlanga explained the motivation behind the initiative, the objectives, and the format of discussions. This was followed by a scene-setting presentation of Mr. Rodney Muriuki from InspiraFarms. The presentation outlined the challenges and successful cases of adding value to the supply chain and reduce GHG emissions at the farm-level by providing energy efficient, post-harvest technologies such as refrigeration.

The experts then joined discussions in four breakout sessions chaired by the moderators; Kandeh Yumkella, Olivier Dubois (FAO), Monica Froehler (Ban Ki-moon Centre for Global Citizens), Filippo Berardi (GEF).

2. FOCUS FOR DISCUSSION

The discussion centred on the following 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 GLOBAL PERSPECTIVES

QUESTIONS

- Which countries offer the best examples of how to introduce sustainable energy at farm level on a large scale?
- 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 at farm level? What examples exist of collaboration that can be replicated?

CHALLENGES

Implementation modalities: There is no 'one size fits all' solution. The choice of implementation modalities, in particular regarding to energy solutions and financing mechanisms, depend on local circumstances (e.g. What type of farm products? What available energy sources? What level of demand?). Countries have different experience on different types of renewable energy, same for both medium/large and small-scale farms.

Financial barriers: Investment costs of energy systems often constitute a major barrier for small-scale farmers. Sometimes operational costs can be significant as well. There is a frequent need for grant support at the beginning of the operation.

Lack of communication between energy sector and agricultural sector: One difficulty is to have the energy sector talk to the agricultural sector. Incentives for this would be that this would reduce food losses, reduce GHG emissions from food chains (important per se but in particular increasingly for reporting of large agri-food companies), and improve both the business case of energy suppliers and of farmers/agribusinesses. Indeed, if the business case of the latter improves thanks to the sale of more and better-quality food, they would be in a better position to pay the right cost of energy – so good for energy companies.

To complicate further the issues mentioned above, we should adopt a **water-energy-climate-food** approach given the strong interlinkages between these aspects which. Therefore, there is a need to address the trade-offs and synergies in this respect. Incentives promoting this holistic approach are usually stronger at local /project level than in national Ministerial level. So, there is a need to bring successful cases of nexus approach to the attention of national decision-makers.

There is an important **need for capacity building** in particular regarding to the maintenance and repair of energy systems, business plans, project development and farmer organization.

OPPORTUNITIES

Tackling financial barriers

Several opportunities exist to address the financial barriers such as organising farmers for group purchasing/request for credit, innovative mechanisms include revolving funds, pas-as-you-go, blended funds, and crowd funding. In assessing the financial challenges, it is important to consider and **highlight the possible benefits from strengthened access to energy for farmers.**

The benefits are; additional income from increased yield and quality of the food, reduced food losses, and from input savings such as using organic fertilizers (by-product of biogas or biochar from solid biomass gasification) instead of chemical fertilizers.

Linking the benefits of energy suppliers and users means switching from the need to reduce tariffs – often not sustainable for energy companies– to financing schemes linking the benefits for farmers and agribusinesses to payment for energy.

Knowledge sharing to promote replication

There is already some collaboration at national / sub-national level. However, in order to 'shift gear' and go beyond piecemeal good projects, there is need for information and data concerning the level of demand, successful financing mechanism and business plans that work /do not work matching of agriculture potential and energy access. Besides the technical features of energy systems, the information on short-term gains of energy systems is particularly important for small-scale farmers and agribusinesses to decide if they would adopt it or not.

Suggested source for further information: Shirley, R. (2020). Powering Agriculture: Unlocking Africa's Next Green Revolution. "Briefing Series: EU-Africa Partnership for a Green Transition and Energy Access," South Africa Institute of International Affairs, Johannesburg, South Africa: <https://saiia.org.za/research/powering-agriculture-unlocking-africas-next-green-revolution/>

3.2 COUNTRY VOICES

Panelists have provided the keywords framing the discussions: Financial Incentives, Energy Accessibility, Policy Support, Access to Finance, Decentralization.

QUESTIONS

- What energy interventions and technologies present the most significant transformational opportunities at farm level?
 - What are the main challenges to the adoption of these farm level interventions at a large scale?
 - How can countries address these challenges? What strategies have proven to be successful? Which countries have succeeded?
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CHALLENGES

No Silver Bullet

There is no “one fits all” type of solution. that can be used for all scenarios to increase revenue and take farmers out of poverty. The electric grid in most rural areas is not reliable. As a result, farmers rely on diesel fuelled generators for electricity.

Access to Finance

Access to finance to pay for equipment is one of the biggest challenges, as well as long returns of investment periods. Sustainable mechanisms to make solutions work and address the long returns of investment are needed. As well as new financial and business models to support farmers.

Lack of certification schemes

Some countries like Uganda, have not certified some renewable energy technologies and farmers have to return to using diesel power plants when faulty equipment fails. This creates mistrust in the technology.

OPPORTUNITIES

Irrigation as a key stepping stone.

Focusing on water inputs and irrigation systems can increase harvest by:

- Increasing the harvest seasons
- Increasing the amount of high yield crops
- Increase growth in dry-seasons

Additionally, introducing irrigation systems at the farm level also “free-up” the time of farmers. Typically, about 2 working days per week are used to collect water for household use, water crops and livestock. Water is an important input to maintain healthy livestock for milk and meat production.

Off-grid systems

Off-grid systems provide access to energy for cooling and irrigation systems that do not rely on the grid. The electric grid in most rural areas is not reliable. As a result, farmers rely on diesel-fuelled generators for electricity. Solar mini-grids offer an opportunity to replace manual labor and/or diesel power generator in rural communities that do not have access to the electric grid.

Public finance

Public finance can be used to de-risk investments for community development and help the uptake relevant technologies. Additionally, entities can provide advance credit to access connection and support in the selection of appropriate technologies.

Farm animal value chain

There are “low hanging” energy efficiency opportunities in the farm animal value chain, from feeding to milking machines, that can help transform incomes at a dairy farm level. Pre-cooling is important for reducing food losses and wasted energy from food that is harvested and not used.

Textile value chain

Aside from food, there are also opportunities at the farm level in the textile value chain such as cotton picking and silk weaving.

Success Story, Nigeria: The World Bank provides Licensing and Finance in Nigeria and has successfully simplified the process for rural electrification. Private sector players can apply with the same application to operation and resources, the license to operate in Nigeria, as well as grant money for the project. This simplifies the process making it easier to start rural electrification projects.

3.3 ENABLERS FOR PROGRESS

CHALLENGES

Insufficient SME perspective

There seems to be a confusion as of why SMEs work together on agriculture and energy and not separately. Developing the bridge between energy access and agricultural development seems to be new, even though it should be considered a logical step. Not all financing programs see this link. SMEs have difficulties in getting local authorities to support them, they are often not a priority for the authorities. Financing for R&D is difficult. SMEs trying to support women associations: when they seek for funding, technical expertise/ assistance, it is difficult to point out the right program. Almost none of the programs work on agriculture and energy topics, it is either one or the other.

Optimizing and reducing the margins matter

Small owner farmers are operating on thin margins, plus these margins are already precarious and volatile. The more burden put on the farmers pocket in terms of costs energy, the harder it becomes for farmers to make an appropriate margin. Small farm owners take small risks for short losses, they cannot afford to take big financial risks.

Cold chains

It is often not seen as a key issue that directly connects with the farm level. Without the well-functioning cold chains, the losses increase, energy efficiencies drop. Financing opportunities among governments require an increase in engagement with experts and communications for cold chains. There is a need for capacity development in the cold chain.

Lack of modern machinery

In Asian countries such as Bangladesh, Sri Lanka and Nepal, there is a missing link between animal traction, power, and the mechanical power. Helping the private sector understand that smaller technical machinery (e.g. smaller horsepower tractors) needs is key. The wrong use of machinery due to lack of know-how causes land degradation and erosion.

Need for expertise

In local villages there is often a struggle with the lack of local expertise. For mini-grid operators it is exceedingly difficult to fill the gap and must seek expertise in different sectors for project support. Short term/ sporadic trainings are not sufficient. There needs to be a mid and long-term training path to guarantee continuity. No clear consciousness about the context – in regional or geographic terms.

Youth and Women

Young people are not willing to stay in rural areas anymore, they tend to move to the cities. One of the reasons of this is the lack of access to affordable technology. 60-80% of farm operations are done by human labor, the lack of modern technology or digitalization is pushing young people to move to urban areas to look for work in different fields. The automation may be displacing labor, but access modern technology can incentive job creation. Women suffers '**time poverty**'. They have a large burden on time due to family and household responsibilities.

CHALLENGES

Technology improvement opportunity

Private sector tends to forget the opportunities that improving rural infrastructure can bring – e.g. small farms can utilize affordable, smaller technologies. Improved technology directly enhances youth working conditions. Modern technology placed at the right size and time, plus training and capacity building can create and improve SMEs and drive young entrepreneurs.

Digitalization of operations – e.g. farmers can call their machinery via mobile (SMS) and/or landlines. This combination of modern technology with simple mechanical technologies with incentive packages leads to greater efficiency, new SMEs that provide these types of services.

Aligning interests

Energy related initiatives on productive uses are energy led and not led by the sector. E.g. the agriculture side on the energy nexus is not led by the agriculture side but by energy developers. The risks and rewards between energy developers and small farm owners should be shared.

Capacity building programs

There are missing links between small farm owners and mechanization service providers. The latter shall be supported and built up locally through programs that focus on **technical aspects** (e.g. training materials for technical features of machinery (small tractors, and seeders) and **basic business skills** (developing basic market research, client needs).

Cold chains: Finding ways to increase the dialogue.

The cold chain industry has been able to identify experts that could engage with different donor communities and people in the field to share technical assistance and lessons learnt. From an economic perspective, identifying high value commodities that need cold storage can provide opportunities to youth and women in building a better economy.

Women and youth empowerment

There are **various** parts of the agri-value chain which are more aligned to empower women and youth than others. The intentionality of engaging women is very important: whether it is as an employee or costumer. In rural areas, groups, cooperatives, associations, groups of families and women have much more impact and are more efficient at finding skills complementarities and having continuous engagement with trainings and technical assistance.

3.4 DATA AND EVIDENCE (DE-RISKING INVESTMENT)

To realize the sustainable energy potential in agriculture an ecosystem needs to be structured in 4 blocks:

- Demand assessment (data).
- Demand stimulation (awareness and services).
- Availability of energy efficient appliances.
- Reliability of quality energy supply.

QUESTIONS

- What are the opportunities and challenges to scale-up sustainable energy in farm-level?
- What data is needed to assess the potential of sustainable energy at farm level within a particular country? What data is available?

CHALLENGES

Farmers are not familiar with the risk assessment

Farmers tend to see the energy investments riskier than investing in their core business (for instance buying more cattles) since they are not familiar in benefits of energy investments. The farmers' focus is on their profit and their decision-making process is short term.

High upfront costs and limited access to finance continue being a challenge. Project preparation is the key to address this challenge. Understanding risk profiles is crucial for unlocking both public and non-sovereign private finance. GPS based data on location and sizes of farms, risks of flooding and pest etc. is needed to add the risk to the cost of capital. It will de-risk investments and encourage private sector.

Restricted access to data

One significant challenge in data collection that in some countries, government do not allow the data to be accessible due to security which hinders start-ups and new business model development. Geo-spatial data is critical for RE.

Inadequate infrastructure

Energy consumption per capita is one of the lowest in Sub-Saharan Africa. Not because lack of need but lack of inadequate infrastructure. Energy outages could be an indicator of non-sustainable energy.

OPPORTUNITIES

Stimulating the demand

There has not been enough work on stimulating demand side from farmers. (focus is more on supply side). IFIs mostly focus on supply side causing demand side lags behind. A lot more attention needs to be put in stimulating demand side through capacity building. Energy efficient appliances should be promoted. Diagnostic tools (such as decision-making tools) should be used to assess the feasibility.

Business models and financial mechanism should address to reduce the risk perception of farmers so that the return/risk becomes more attractive compared to other investments. Pay as you go, modular and mobile units and integrated packages are good examples of innovative business models. Programms such as PFAN are opportunities to help farmers to access sustainable finance.

We should also look for alternative ways of making clean energy investments more attractive such as incentives (government regulations), branding the products as organic, bio, etc.

Available Data

Some data sources (satellites, weather stations, field sensor) are available, although you need field experts (farmers, traders, technician) to turn data into useful information such as drought risks, irrigation support, fertilization support. Transforming data into useful information is often neglected. And useful information turns into a wisdom at the farm-level.

Data can be utilized to analyse the ability to pay so that financier can assess their risks. For this, data is needed on; risk profiles (climate, technology, environmental, social), market, cost of capital, data governance standards, analytical capacity to arrive at energy solutions/mix that will meet production, storage, processing, marketing for specific green value chains. Additional data is needed on:

1. Energy consumption
2. Income data
3. Environmental and social risks and climate risk
4. Weather information

4. RECOMMENDED ACTIONS

4.1 GLOBAL PERSPECTIVES

- Bring back the added value needs to the farm level. Post farming processing increases value resulting in more price negotiation power. Consumers would be willing to pay more for the service if it increases their productivity and income
- Strengthen farmers to better position them to negotiate with the business.
- Map the links between energy and food at country level.
- Policies targeting cooperatives can leverage economies of scale.
- Consortium of institutions can assess technologies for different countries - depending on their climate and other conditions.
- One global organization/platform such as SE4All to become a repository/one-stop shop on information regarding food/energy links - with support of other organisations like UNIDO, FAO, Power for All, REN 21. This would improve the current situation, where one has to look at several ag/energy platforms.

4.2 COUNTRY VOICES

- Use a nexus approach in the ecosystem of finance, technology and development.
- Embrace a collaborative approach.
- Provide consumer education and assist with selection of appropriate technologies.

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- Look at the entire value chain to identify opportunities for sustainable energy interventions.
 - Well done regulation and incentives are critical to create an enabling environment for successful rural electrification. Countries can offer incentives for private sector players such as duty-free technologies and zero-rated taxes, so that these sustainable technologies can enter the country duty free.
 - Countries can also invest in common facility centers with infrastructure finance to provide key resources that cannot be owned at a farm level.
 - Countries can package solutions to facilitate access and scale-up to service providers.

4.3 ENABLERS FOR PROGRESS

- Consider three-legged stool approach: training, technology, finance.
- Contextualize what is needed along various agri-value chains. Slice and dice the agri-value chains and the markets to understand the energy intensity to later recognize how they can become more efficient and cleaner.
- Education and training on farm are crucial particularly on cold chains. Conduct gender responsive trainings. Men that engage women in decision making issues, tend to have higher opinions about women.
- Value of financing and micro-financing to support women and youth to enter the market in an appropriate and sustainable way.
- Address social barriers as part of the solution: (most) women spend money on their family and not on business investments. Find social solutions that support addressing time poverty: e.g. subsidized child-care. Knowledge exchange platforms (at the country level) are a great way for women and youth associations to seek support.

4.4 DATA AND EVIDENCE

- Sustain the demand for sustainable energy at the farm level, show the profitability which will result into bankability (then the financial sector comes into play using traditional financing tools). Put attention in stimulating demand side.
 - Risk management capacity of all the actors need to be strengthened and informed by data. If risks cannot be managed, investments will not be sustainable.
 - Use data to assess farmers' the willingness (field and household surveys) and ability to pay for designing efficient financing mechanism and business model.
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- Policy makers in governments should understand the trade-off and balance between sharing information (e.g. satellite data access) and enabling environment for entrepreneurs. They should be aware of accessible data allow private sector investment.
 - Give attention to the quality of supply of energy services. To influence the decision making towards sustainable energy investments, the provision of energy should be a service model not only a transaction of a product (classical model). Provided services can include operation and maintenance to make sure the farmers that the system will be working - farmers often lack the required technical capacity on energy systems.
 - Share the data with farmers. If the data is shared with farmers, the data collected with new technologies (geo-spatial, AI) can directly increase the profitability of farmers (since they can use it for making decision on life-cycle benefit, remaining shelf life, real-time prices) and bankability of the investments which lowers the risks for investors.
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