Opportunities & Challenges for Solar Dryers In Cambodia



SWITCH to Solar

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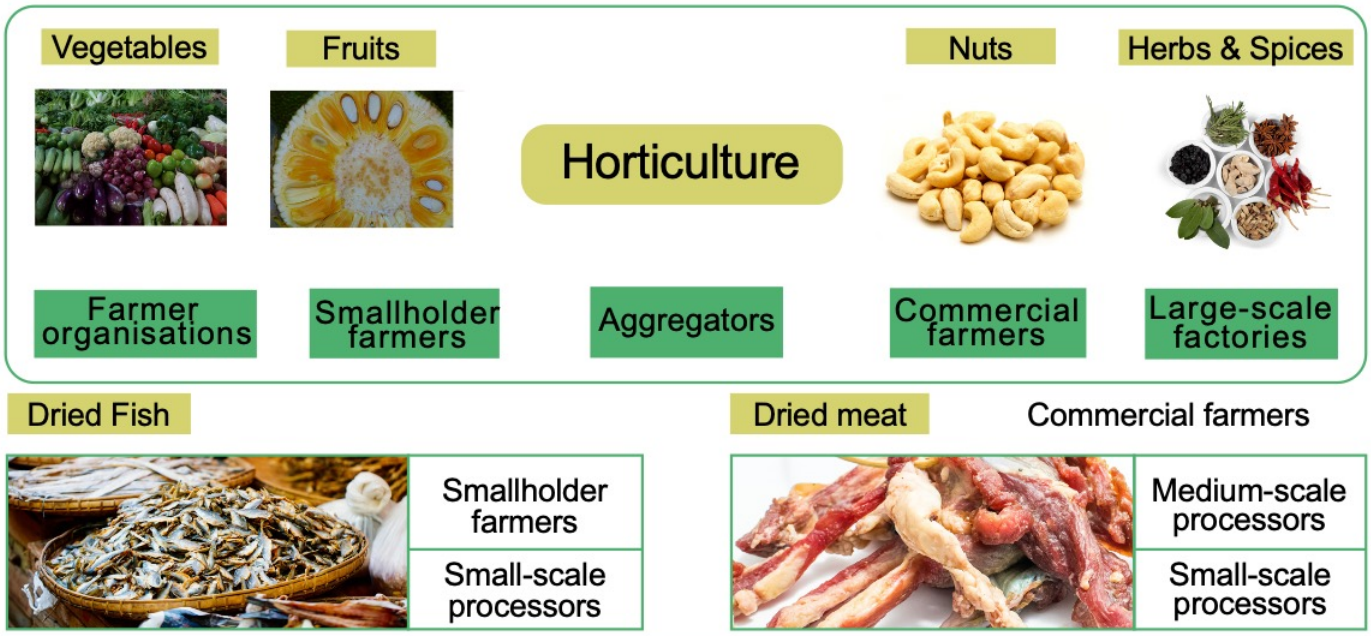
In recent years, Cambodia's electricity secto has been through outstanding improvements fuelled by the government's success in rapidly expanding access to grid electricity up to 81% of at the end of 2020. Nonetheless, in light of the relatively high electricity costs, remoteness of farmers and overall low mechanisation of the agriculture sector, solar technologies for productive use have the potential to improve agri-fishery MSMEs competitiveness on the market while reducing their operational costs. This summary provides a short overview of the opportunities and challenges for the adoption of solar dryers in Cambodia.

Starting by looking at drying technologies at large…

Food drying is quite versatile, as the same process can be used in many value chains and for many different products. One of the specificities of drying is also that it can be done by a wide range of stakeholders, involved in production or post-harvest activities, specialised in drying or not, drying in a centralised or decentralised model and operating at different scales. It is worth noting that the focus of this study was drying, not smoking, though both process might seem similar, the technologies used, opportunities and constraints are quite different.



In the selected value chains of horticulture (vegetables, fruits, nuts, herbs & spices), aquaculture and livestock (cattle) the opportunities for drying are very varied and influenced by the needs and requirements of each stakeholder.

The consideration of these different needs and requirements reveals both opportunities and challenges to the adoption of dryers, as detailed below.Opportunities that can positively influence the uptake of drying technologies include:

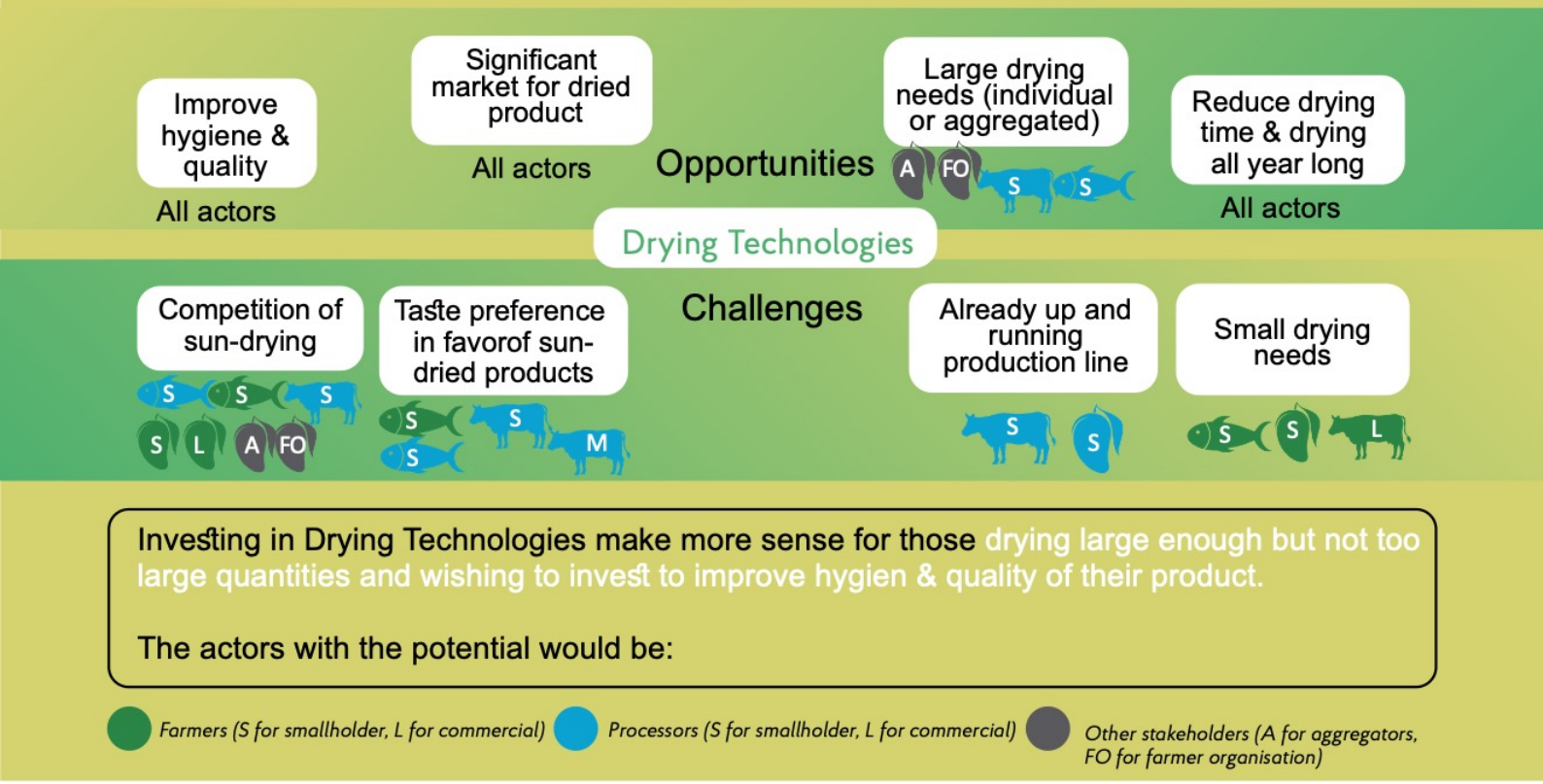
- **Improving hygiene & quality and reduce drying time:** compared to the most common drying method, sun-drying, for which products are laid in the open-air, drying technologies significantly improve the hygiene and quality of the production, while reducing drying time and allowing the production to be less dependent on weather conditions and thus reduce production seasonality.

- **Large market for dried products:** Cambodia bears the advantage of dried products being fully part of the diet and vastly eaten, meaning a significant market exists for dried products.

On the opposite, challenges that need to be considered encompass:

- **Competition of sun-drying:** if drying technologies have many advantages over sun-drying, sun-drying still is virtually free, very modular and benefits from a fine knowledge of stakeholders in terms of drying time and practices

- **Taste preferences:** consumers are used to the taste, texture and price of sun-dried products and might not be open to a new segment of products, especially for fish and meat.
- **Difference in drying:** though a lot of products can be dried, not all products can be dried the same way and with the same technology. Depending on the texture, color and moisture content to achieve, different technologies will be more or less suitable for each product.



Investing in Drying Technologies make more sense for those drying large enough but not too large quantities and wishing to invest to improve hygien & quality of their product.

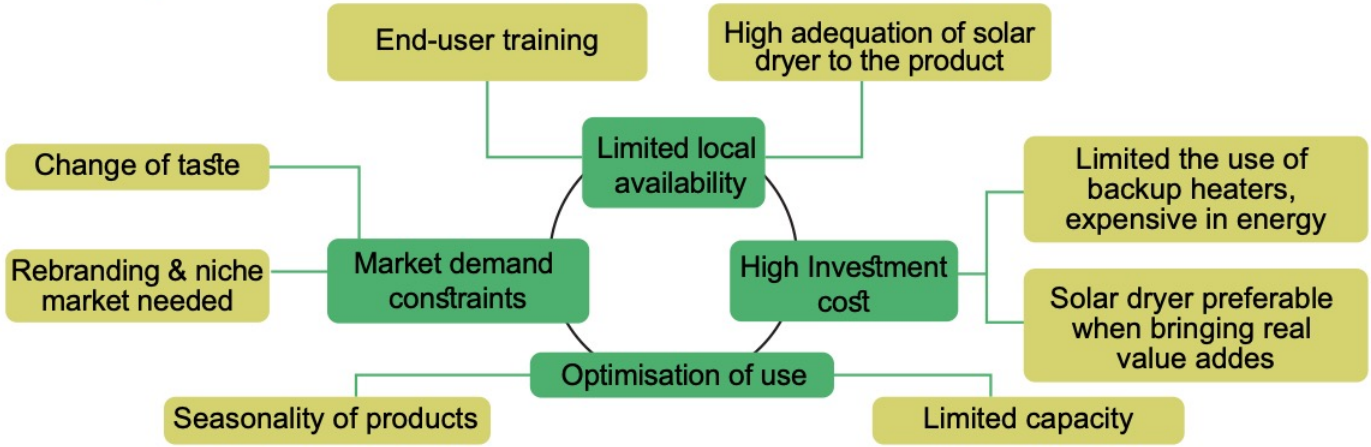
The actors with the potential would be:

Farmers (S for smallholder, L for commercial) *Processors (S for smallholder, L for commercial)* *Other stakeholders (A for aggregators, FO for farmer organisation)*

Overall, it appears that investing in a drying technology makes more sense for stakeholders having bigger and more regular drying needs, at an individual level such as **meat and fish processors** or at an aggregated level such as **farmer organisations** and **aggregators** in the horticulture value chains. Investing in drying tech-nologies, since it raises the cost of production of goods, also means targeting higher-value markets, mostly premium markets (locally or internationally), something that not all stakeholders are able to do.

Technical considerations

Solar Dryers are still at an early stage of development in Cambodia. A few solar technology providers distribute solutions in Cambodia, but the offer stays limited and it can be one of the constraints to the adoption of solar dryers. Current drying practices, whether through **sun-drying or electric drying,** associated to the own limitations of solar dryers reveal 4 main technical constraints to the adoption of the technology, the key ones being the **need to secure a premium market and to optimise the use of the dryer**.



Capacity	Sun	Electric	Solar
<10Kg	$0	$100-$200	<$1000
~100-150Kg	$0	N/A	~2,000$
>1000Kg	$0	N/A	5,000$-15,000$

Another constraint to the adoption of solar dryers is their **high upfront costs**, especially compared to sun-drying. In particular, at large scales, solar dryers consist of costly green-houses that are ventilated with solar.As such, solar dryers cannot be economically viable for small stake-holders on an individual basis. Yet, they allow savings in terms of operational costs and can help end-users increase the price of the final product due to improved quality. Solar dryers can thus be quite interesting for stakeholders with higher productions

Recommendations – How to be successful in distributing Solar Dryers?

The uptake of drying technologies bears great potential to be able to improve the quality of products and help MSMEs increase their income in an economically and environmentally sustainable way. Yet, there are challenges to overcome to be able to develop such a solar powered solution at scale. Here are a few recommendations to increase the adoption of solar dryers in Cambodia:

- Since dryers make more economic sense for high value-added products, it is key for producers using solar dryers to **secure a premium market**.

- It is beneficial to create **synergies** between actors with expertise in energy and actors with expertise in drying of different product to encompass the full spectrum of knowledge needed to distribute solar dryers. Knowledge in marketing would also be needed to be able to identify and sell to premium markets.

- It is important for end-users to optimise the use of the technology. **Improving the local offer** of solar dryers and **providing tailor-made solutions** is thus key to ease the uptake of solar dryers in Cambodia.

- It can be hard for technology providers to identify and target suitable profiles of stakeholders, especially as the benefits of solar dryers are still mostly unknown in Cambodia. It is recommended to **establish partnerships** with local authorities, NGOs, cooperatives, associations or development programs with strong local networks to **test innovative distribution models** whereby the partner would help in the identification of end-users. Working with intermediaries is also key as they can **help facilitate the acceptance of the technology** by acting as models and advertising, not only the economic aspects of solar dryers, but also other benefits.

- It is recommended to **focus on stakeholders that have high drying needs**, whether centralised or aggregated, and in particular those that have higher investment capacity.

- In all cases, it is important to **introduce end-user financing mechanisms** to mitigate the high upfront costs of the solutions and make solar dryers more interesting compared to competitive solutions. It can be done through partnerships with MFIs, simple financing mechanisms by technology providers themselves (payment terms), or more innovative models such as contract farming- working with aggregators for example who can provide the technology to and aggregate the production from small farmers drying at individual scale.

SWITCH to Solar

For a Thriving Agri-Fisheries Market



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