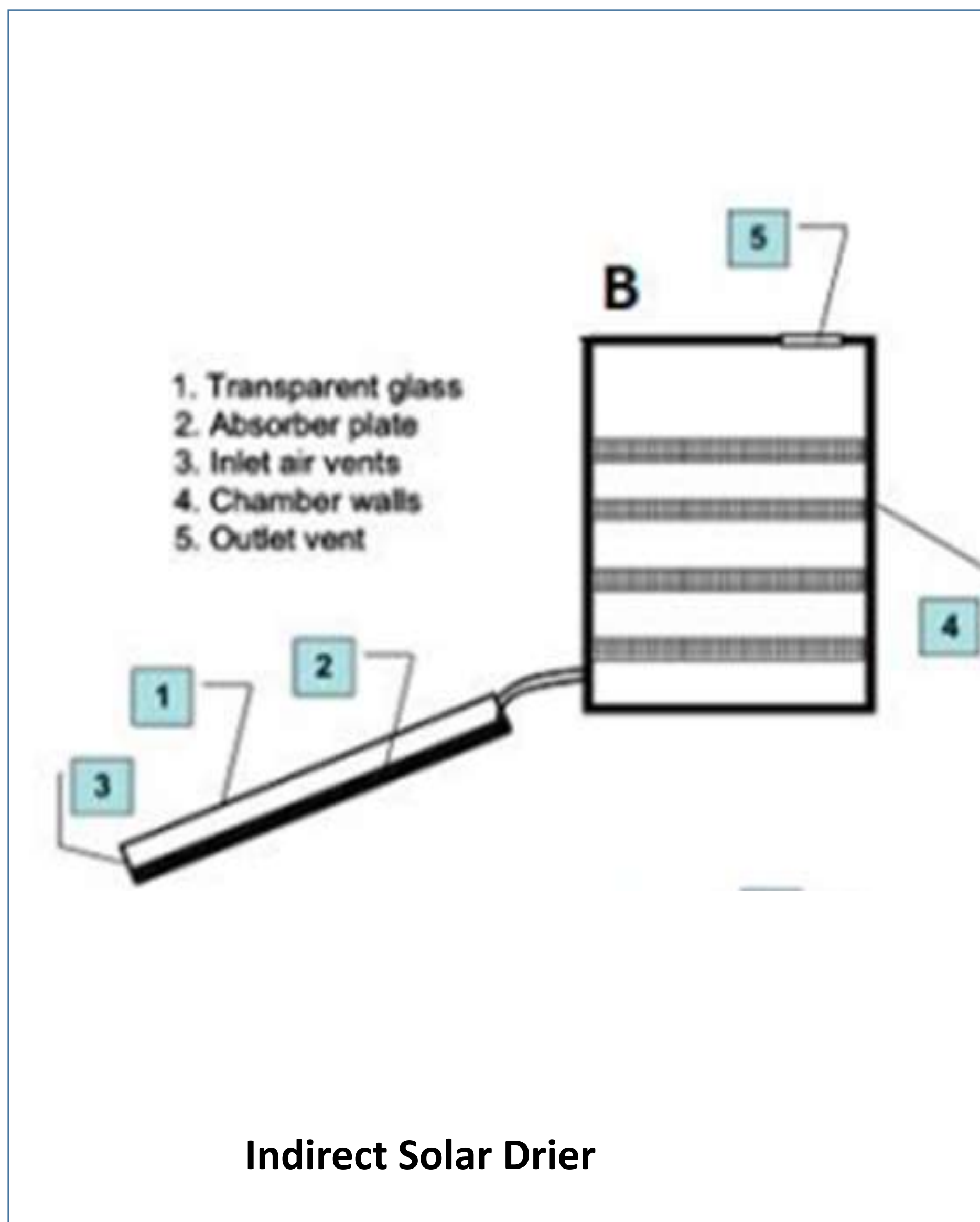


Construction and Validation of Photovoltaic Powered Fan Supported Solar Drier Prototypes in Asella, Ethiopia

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Introduction

- ✓ In Ethiopia Agriculture is important sector, i.e horticultural crops play important role in poverty alleviation(ATA, 2014),
- ✓ Arsi zone,have good potential of vegetable production (Hunde, 2017)
- ✓ In spite of high potential, producers forced to sell their produce at low farm gate prices due to lack of improved technologies
- ✓ Therefore, introducing enhanced processing and storage technologies is circuital (Tadesse Kuma, 2015),
- ✓ Solar driers, important technologies in maintaining the postharvest quality of fruits and vegetables (Sibanda, & Workneh. 2020)



Model of indirect Solar driers Prototypes

A) ICARON 1.5 Dryer model

- Good drying capacity,
- Used to dry (Meat, medicinal herbs, fruits &veg),
- Can be made by local craftsmen,
- Can be made local available material,
- Easily movable
- Dry produce as fresh produce & vitamins
- Moderate price



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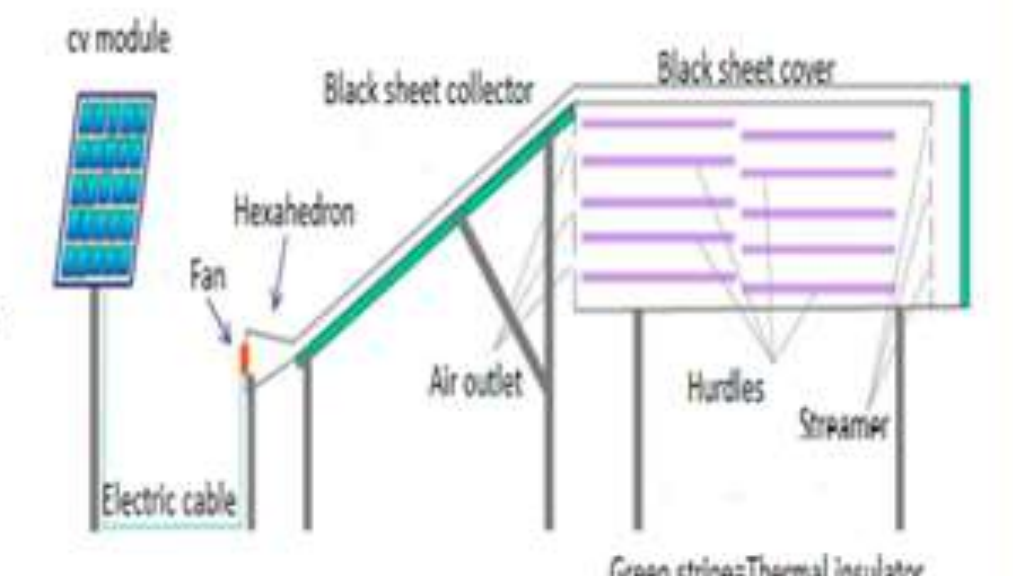


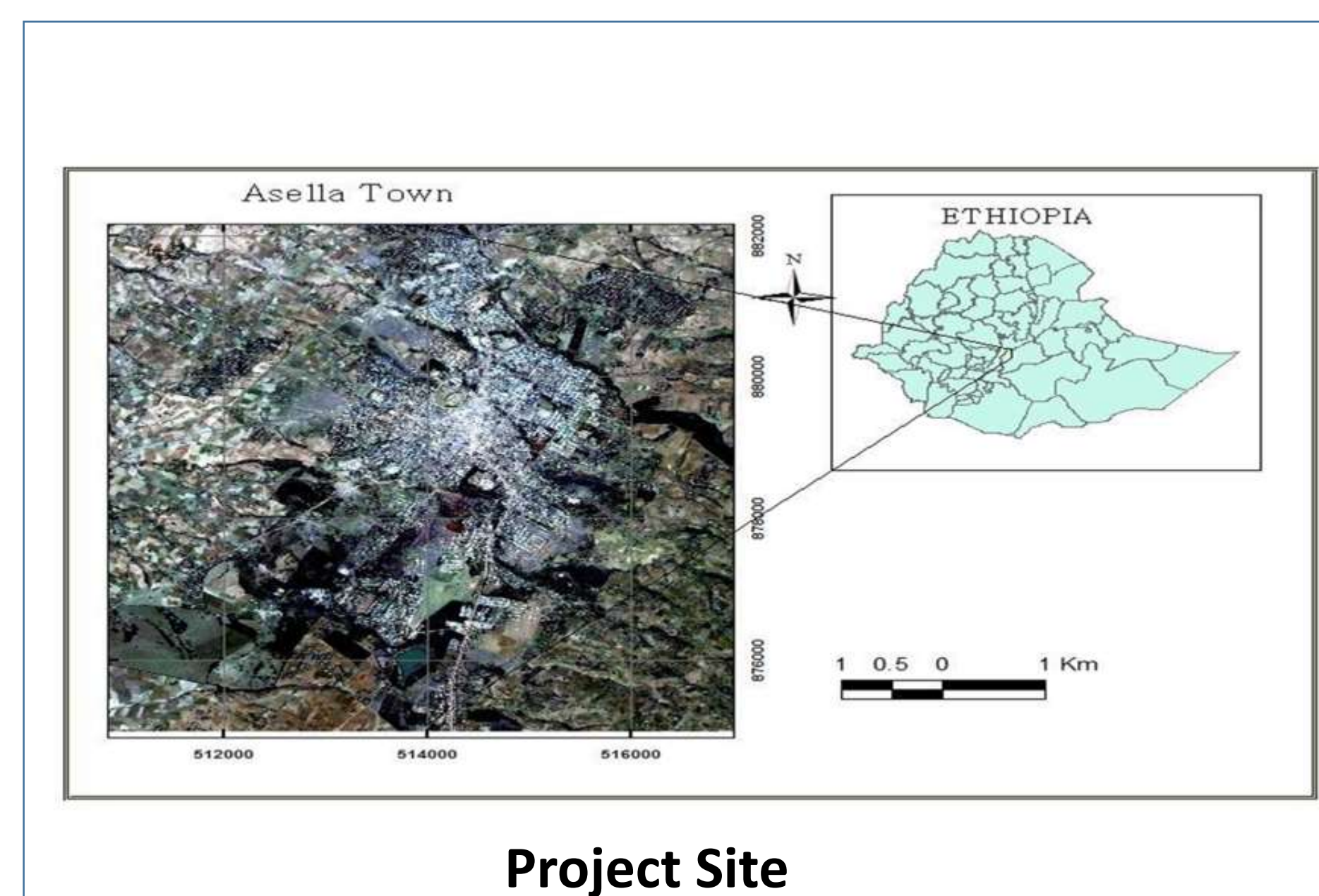
Fig. ICARON 1.5 Dryer Model

General objective

- ✓ To construct and validate(field test) the performance of indirect solar drier prototypes (Tunnel and ICARO 1.5) for scaling up in Arsi Zone, Oromia Region, Ethiopia.

Specific objective

- ✓ To Construct the prototypes
- ✓ To validate the efficiency of the prototypes
- ✓ To field test the prototypes on selected vegetables(onion, garlic, tomato, kale, pepper and potato)
- ✓ To recommend the best solar drier for scale up

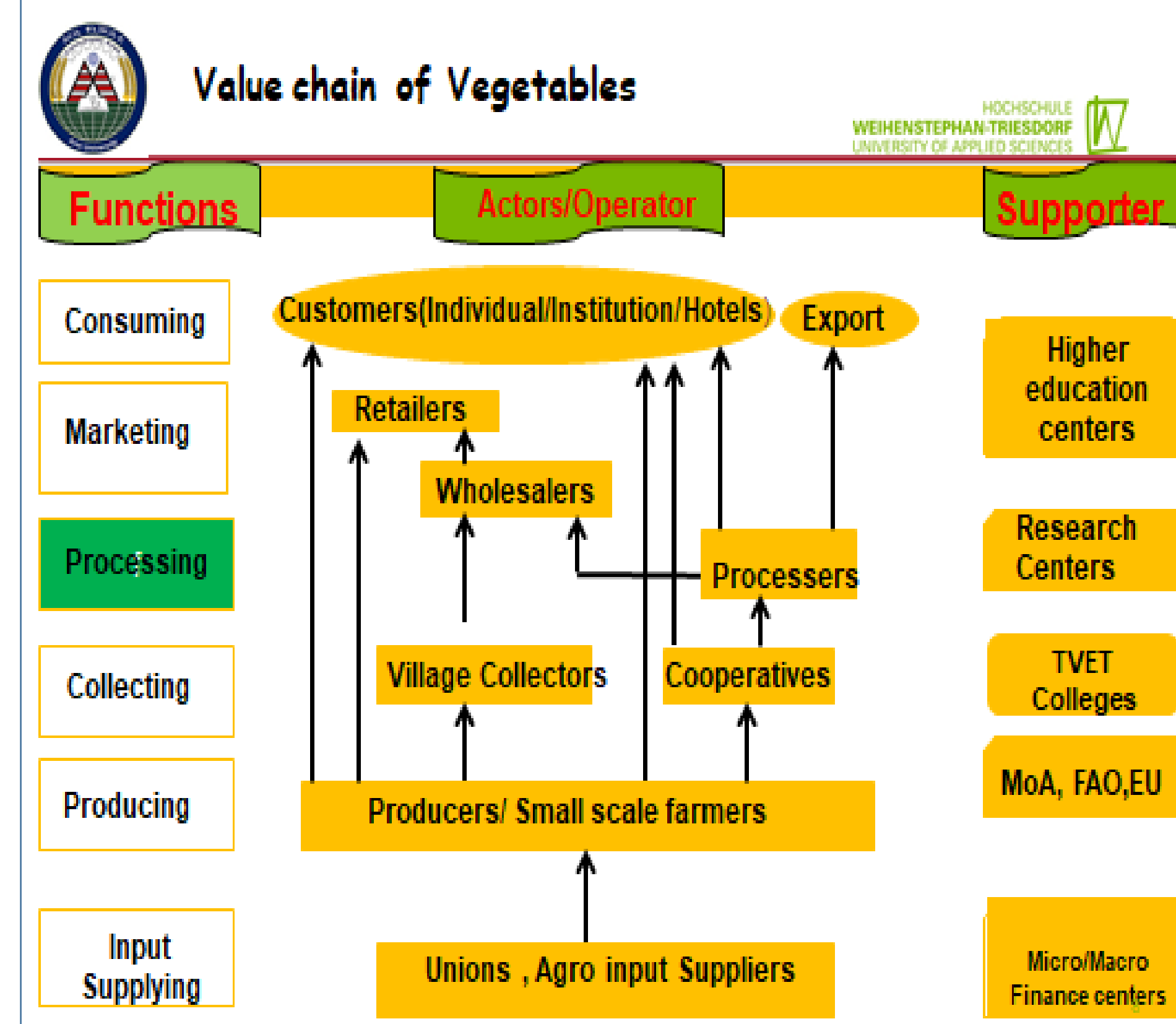
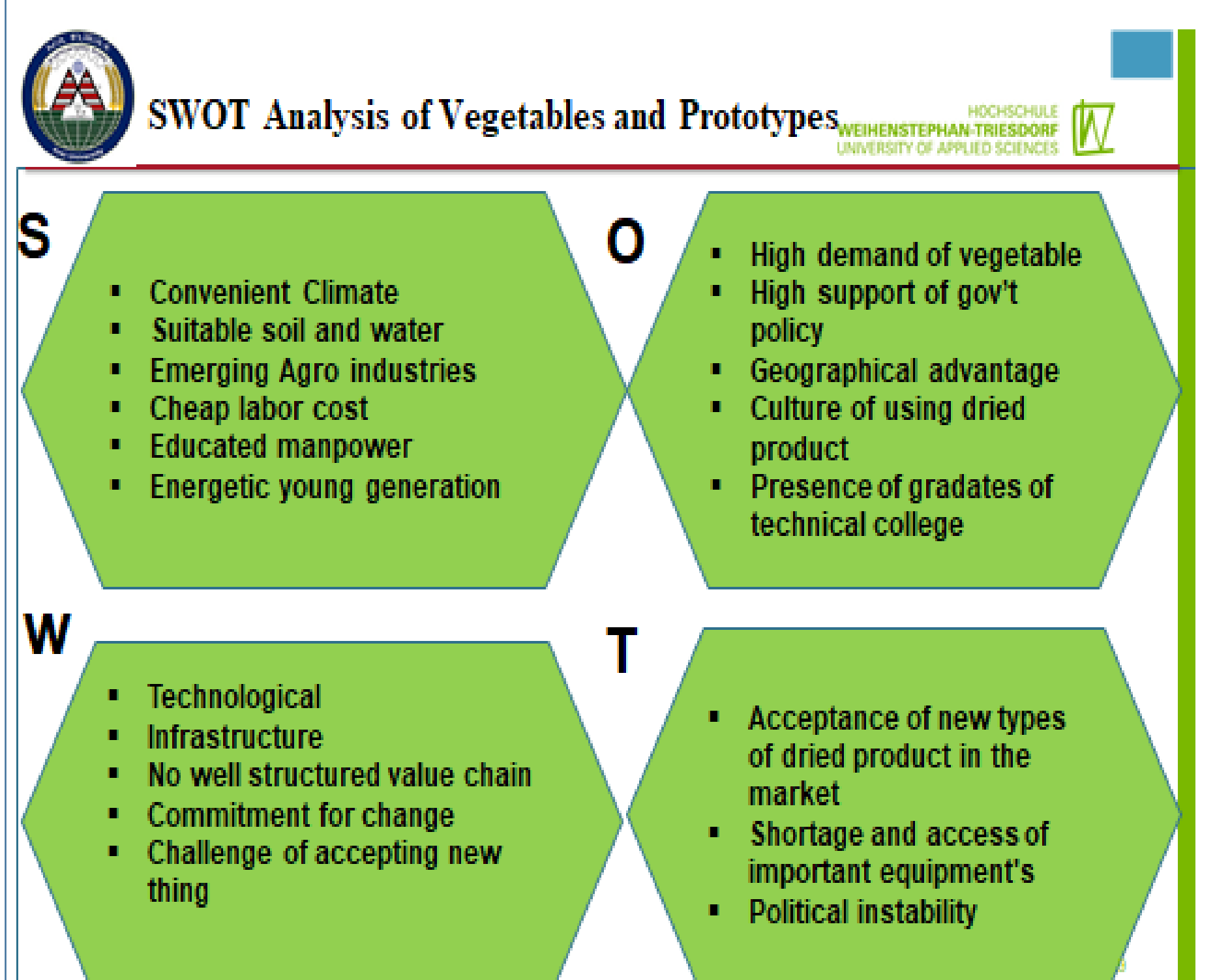


B. Tunnel Solar Drier

- Used for tropical subtropical region
- Commercially known
- Photovoltaic cell to power the fans,
- Fan reduce drying time,
- Air circulate through collector,
- Heating unit,
 - Contain combustion chamber
 - Heat exchange bottom plate
 - Removable roof & chimney



Fig :Solar Tunnel Drier



Evaluation of drier performance

- Important parameters affecting performance of dryers will be measured
 - Temperature
 - Air Velocity
 - RH
 - Solar radiation
 - Determination of collectors efficiency
 - Determination of drying rate
 - Determination of Proximate composition
 - Sensory evaluation

Expected Outcome

- Reducing postharvest losses of produce
- Maintain quality and Safety of produce
- Increasing incomes of farmers
- Improving the potential of the farmers to reach new markets and customers
- It can be adopted by farmers of other area of the country
- Consumer can get quality and safe products
- Create Job opportunity for Youth and Women

Summary

Solar drier

- Used for processing both in the rural and food industry.
- can be made with locally available tools and materials, & are easy to build.
- can be beneficiary for young Entrepreneurs, women's and farmers cooperatives.
- Availability of safe and nutritious produce will increase & the consumer will pay reasonable price.
- Producers will get bargaining power and get better return.
- Are environmentally friendly