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TACKLING POVERTY THROUGH RENEWABLE ENERGY

Solar Water Lifting Technology and MUS for Energy-Poor Communities

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International MUS Workshop

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Introduction

The objective of the presentation is to share outcome and learnings from Solar MUS I program and way forward for up-scale in a sustainable manner.

The finding shared in this presentation is based on field survey from six Solar MUS sites (RW/iDE/ SAPPROS/SEN) and Sirubari/Dhital project site case study.

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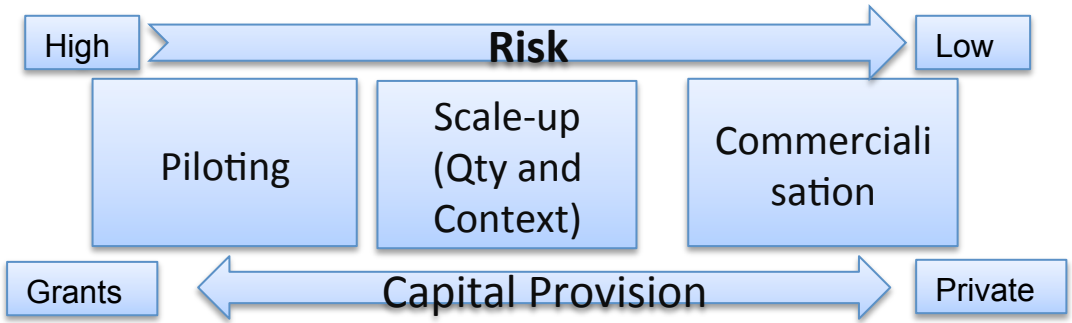
Renewable World is an international charity working in South Asia (Nepal, Bangladesh), Central America (Nicaragua) and East Africa (Kenya, Ethiopia, Tanzania)

Programs in Nepal/ Bangladesh

- Community owned bio-gas for livelihood enhancement;
- Hydram - a water lifting technology;
- Solar Energy -
  - Solar Water Pumping (Solar MUS)
  - Solar micro-grid (multiple use)
- **Prospective technologies and work**
  - Bio-mass and bio-fuel
  - Micro Hydro – promotion of productive end use
  - Wind/solar Hybrid
  - Appropriate small scale technology – Back-pack, plastic bag-digester
  - Papa pump



Solar Multiple Use Water Services (MUS)

Benefits:

Increased income by cultivating high value crops (mainly vegetables) year round;

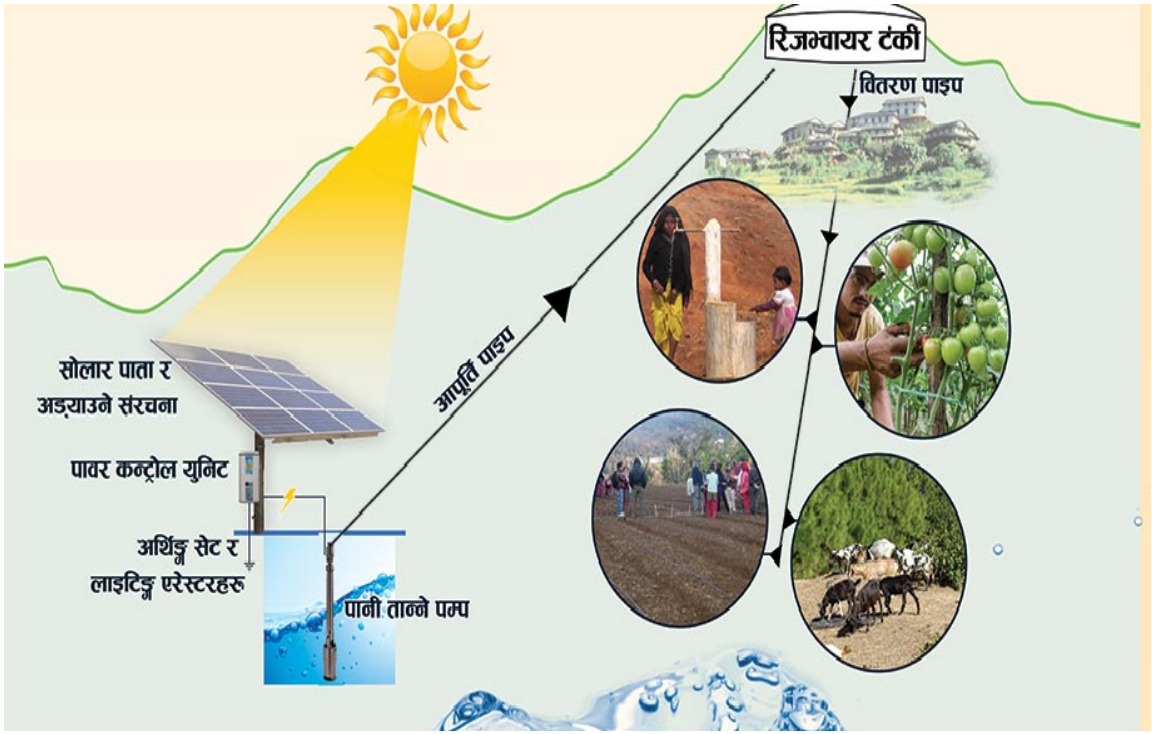
Improved health and nutrition;

Reduced workload of women and children;

Improved in hygiene and sanitation due to availability of sufficient water.

Women's economic empowerment and meaningful participation at households and community level;

Solar MUS is a system where solar powered water pump lifts water from a lower situated source to community residing at higher locations. The pumped water is collected in a reservoir and distributed through gravity system amongst the households. The water is mostly utilized for domestic and productive uses, such as: micro-irrigation.

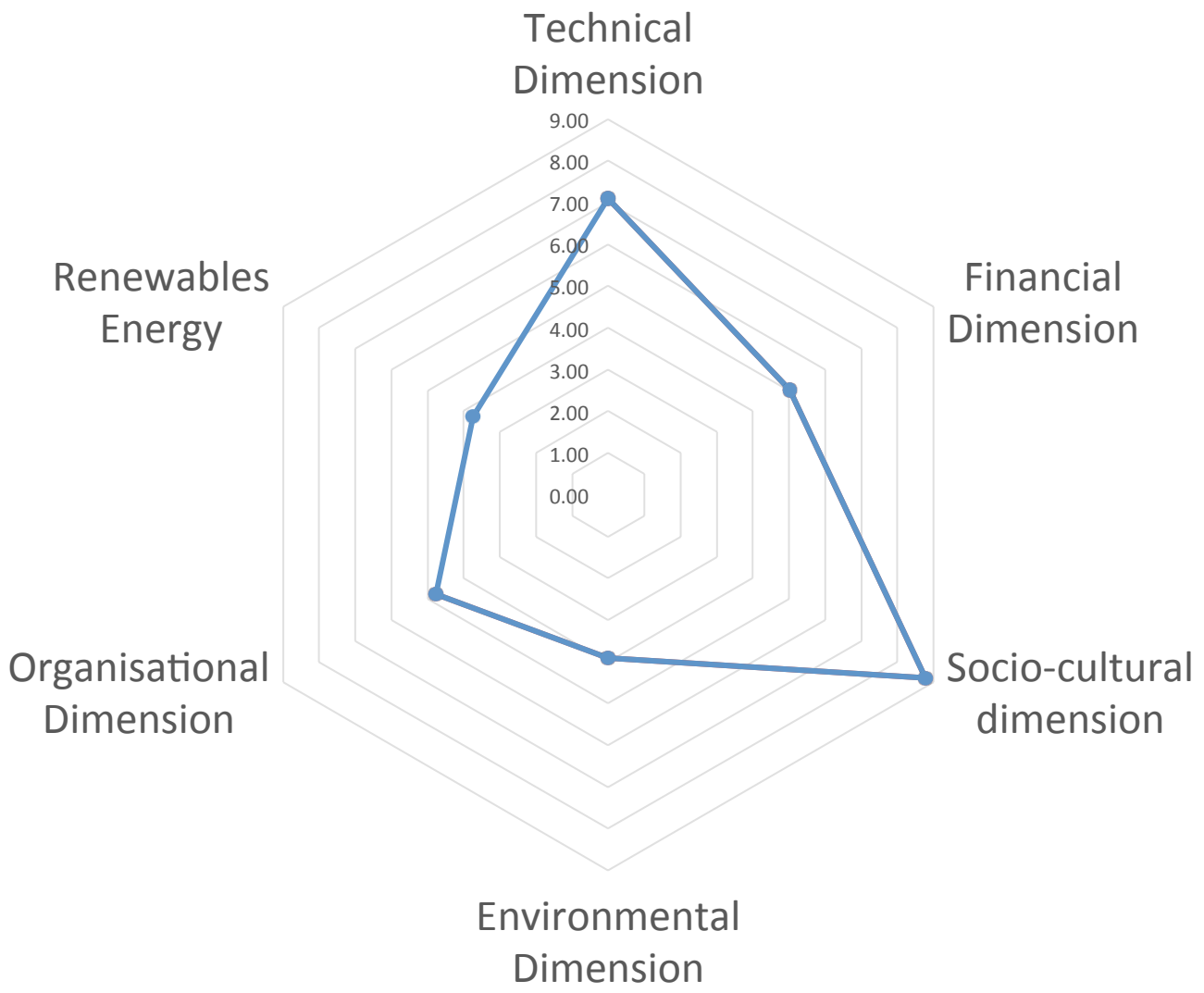


Project outcomes sharing – a case study from Sirubare and Dhital

Total Project beneficiaries – 32 HHs; **Total survey respondents** – 50% of the 32 HHs
Methods – Qualitative and Quantitative study; **Tools** - Baseline/year one study Household and agriculture survey, case study, FGDs, sustainability analysis

Project outcomes	Findings (Sirubare, Syangja)	Findings (Dhital, Kaski)
Time saved by households	On average 3 hrs, min. 1 Hrs to maximum 5 Hours per day.	On average 2.7 Hours, min. 0.4 Hrs to maximum 7.5 Hours per day.
Increased crop intensity	60% households	70% households
Increased income from Agriculture	75% HHs; on average Rs 60,000 Ranges Rs 6,000 – 200,000/ annum	70% HHs; on average Rs 35,000 Ranges Rs 5,000 – 270,000/ annum
Improved health	87.3 % reported improved health post intervention	71.4 % reported improved health post intervention
Improved school attendance	42% households	43 % households

Sirubari/Dhital – Sustainability Analysis



Overall Learnings

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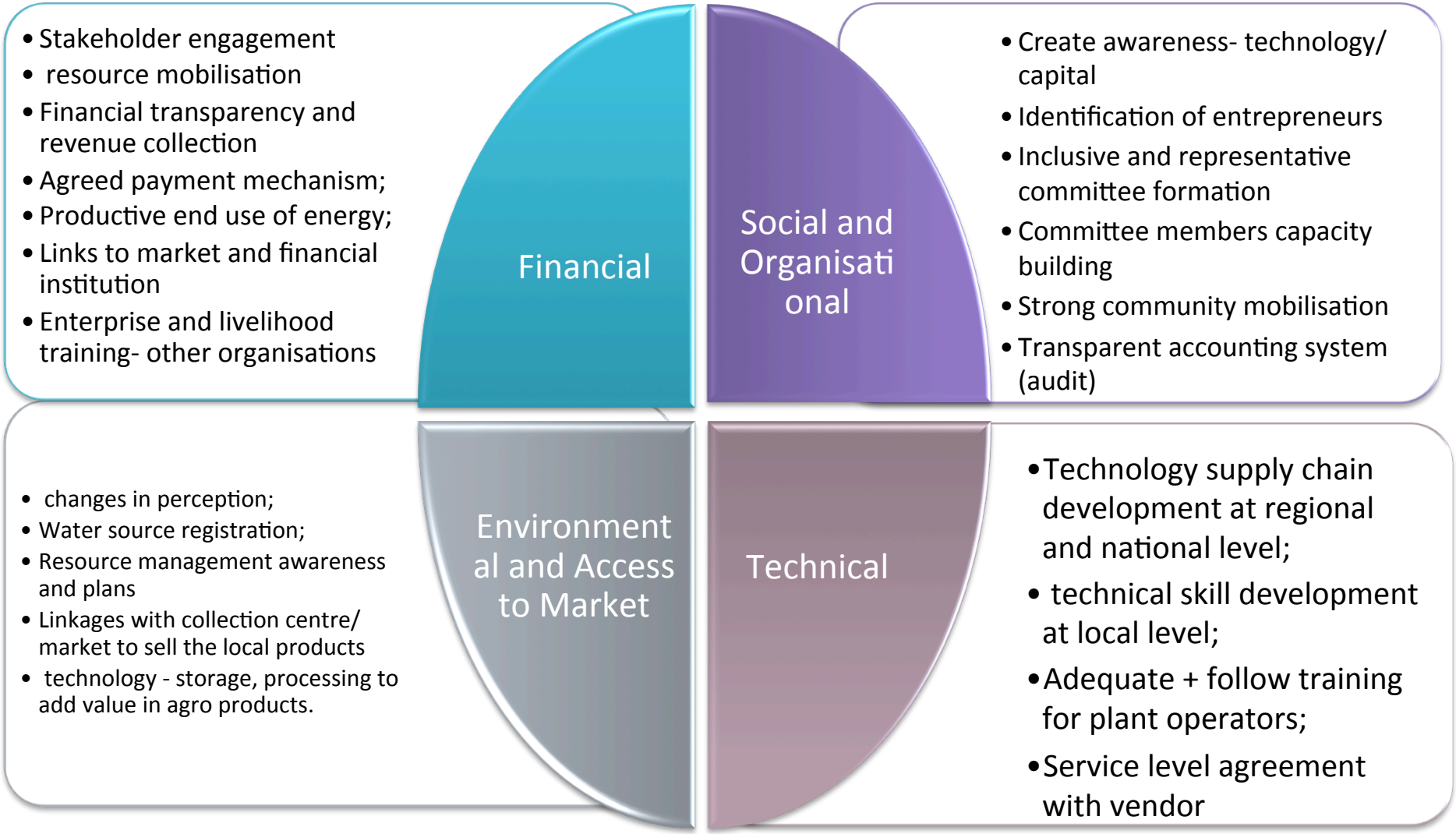

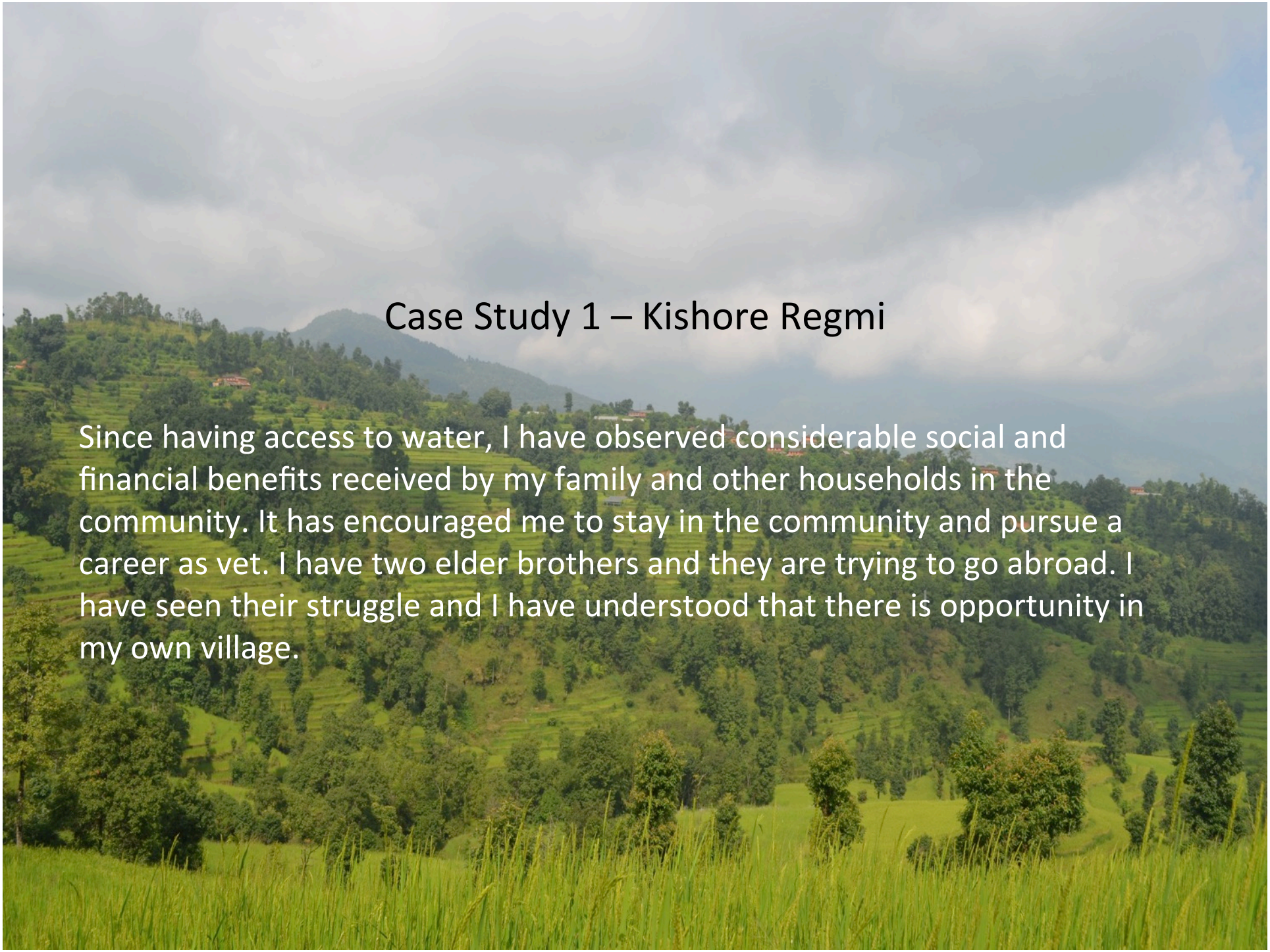

Case Study 1 – Kishore Regmi

Since having access to water, I have observed considerable social and financial benefits received by my family and other households in the community. It has encouraged me to stay in the community and pursue a career as vet. I have two elder brothers and they are trying to go abroad. I have seen their struggle and I have understood that there is opportunity in my own village.

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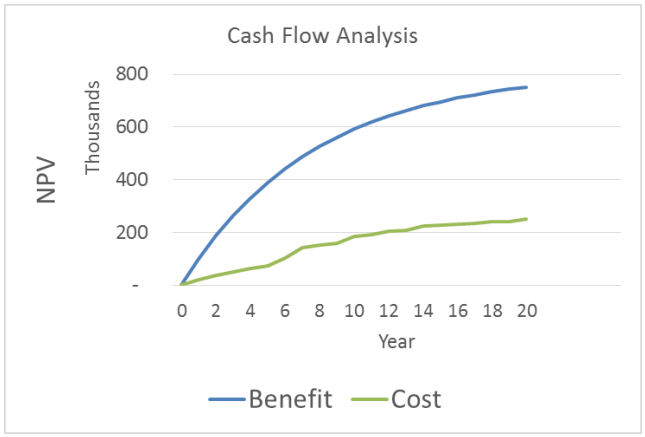
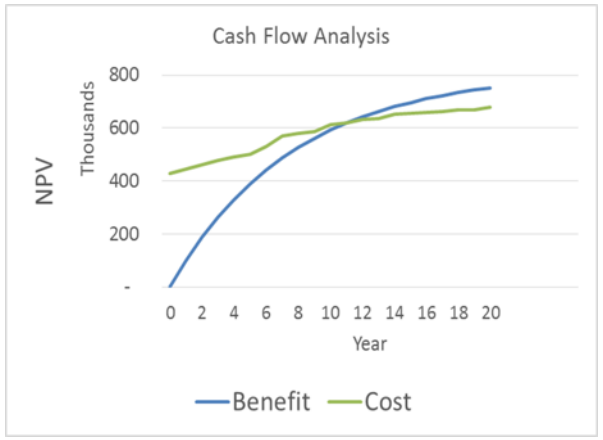
Way Forward/Opportunities

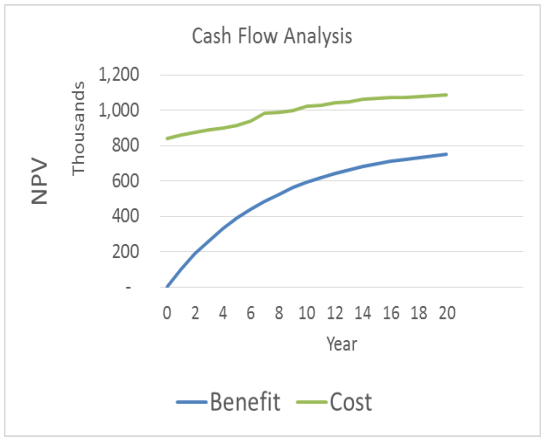
- Demand led approach, establishment of capacitated management committee and community mobilisation- Social Aspects;
- Technical supply chain Development;
- installation of remote monitoring (performance, supply and demand) and billing mechanism.
- Payment structure and manual metering system (EK GHAR EK DHARA)
- Value add and use of energy for multiple purposes
- Introduction to mixed financial model

Cash-Flow Analysis

- Scenario-1
  - Initial Investment : **100% grant**
  - Annual O & M cost: Revenue collected from users
- Scenario-2
  - Initial Investment : **75% grant, 25% equity/ loan**
  - Annual O & M cost: Revenue collected from users
- Scenario-3
  - Initial Investment : **50% grant, 50% equity/ loan**
  - Annual O & M cost: Revenue collected from users







Features:

Total Initial Investment: 1.7 million NPR

Beneficiaries: 32 households

Daily pumped water: 14,000 litres

Lift Height: 80m

Water uses for domestic and micro-irrigation

Fee structure:

Drinking: NPR 100 /month/household

Micro-irrigation: NPR 200/ropani /month

Project life span: 20 years

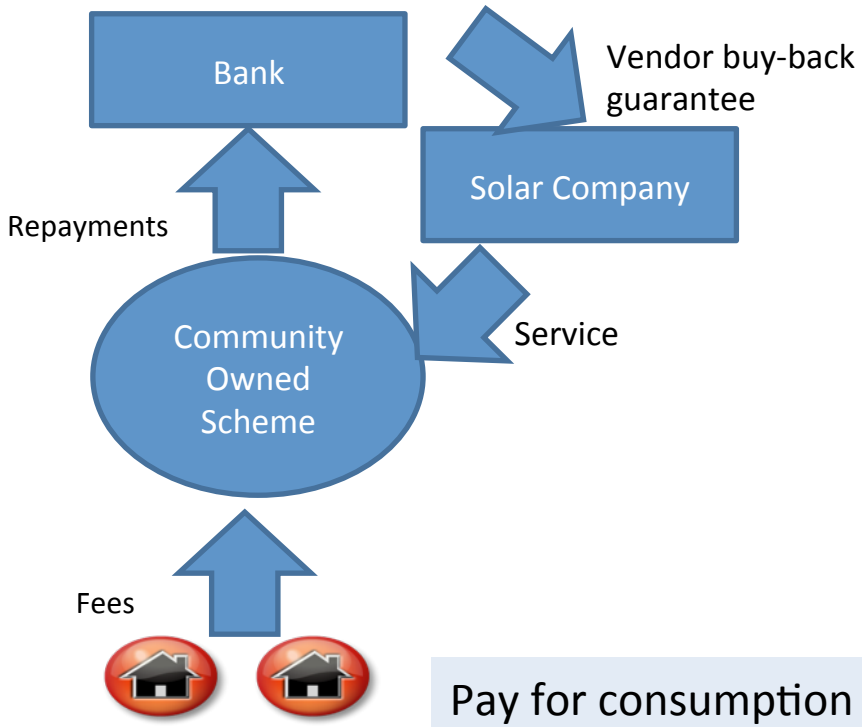
Discount rate :14%

Financial Sustainability

Introduction to mixed Financial Model

Bringing private sector as an investors is important for scale up

Community owned model



Pay for consumption (flexible tariff system)

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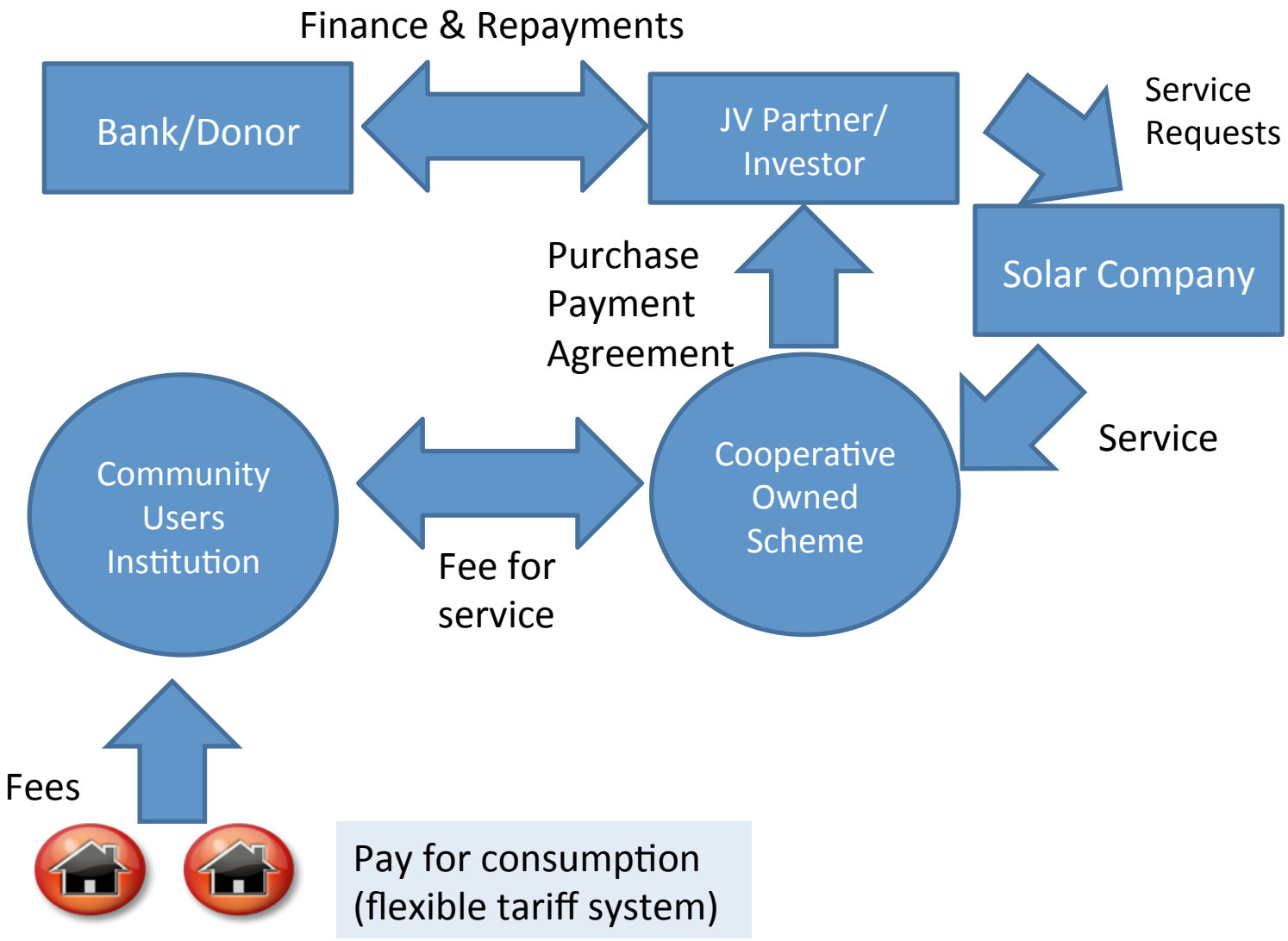
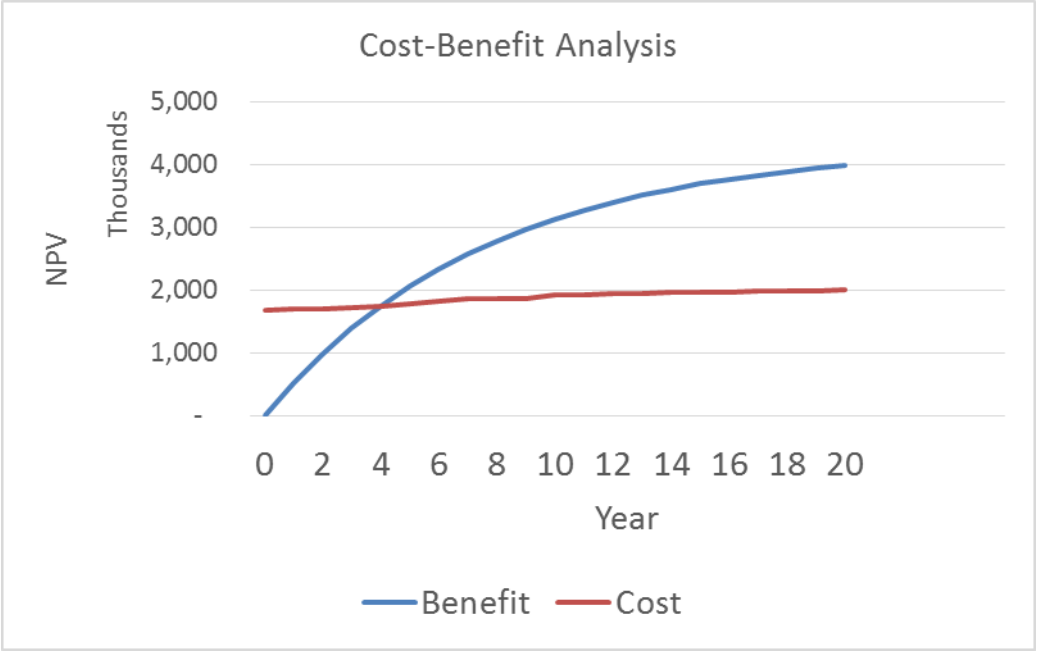
Local Cooperative/collection centre owned model



Cost-Benefit of Solar MUS Project

- Only tangible benefits like: time saving, increase in agricultural production are considered

IRR	34%
NPV	1,982,916
B/C Ratio	1.99
Payback Period	4.00

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Thank you
Lata Shrestha – Program Manager
Baburam Paudel – Technical Manager