

Economic and Social Commission for Western Asia

Case Study: Drawing Lessons and Emerging Good Practices from Renewable Energy Projects in the Arab Region

Khaled Bedoui, ESCWA Consultant

Workshop on “Access to Finance for Municipalities – Nexus Thinking and Decentralization of Subnational Governments”

The St. Regis Amman Hotel, Amman, Jordan – 29-30 January 2020



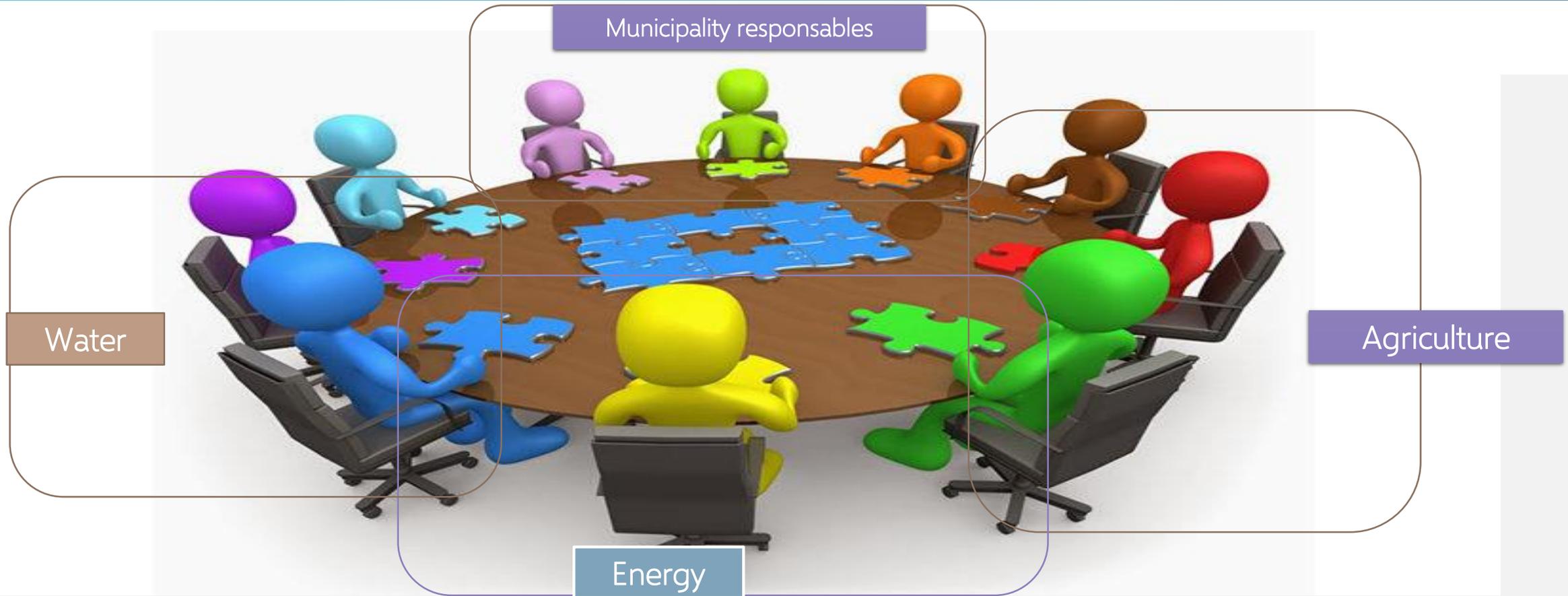
UNITED NATIONS

الاسواق
ESCWA

Shared Prosperity **Dignified Life**



Nexus In Municipalities

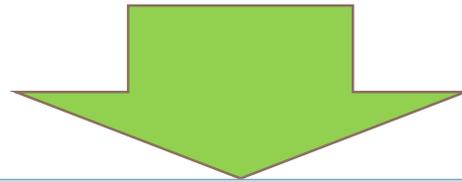


But What Kind of projects....??

Some Small scale Nexus projects

Solar Water Desalination for water drinking and agriculture

The Arab region is one of the world's most water-scarce and dry regions; agriculture is consuming an average of 80% of available water resources



Non Conventional water resources : desalination, the reuse of TWW

The using of solar thermal Energy for desalination



Solar powered desalination plant by Thermosolar in Oman.

Photo Credit: Robert Kyriakide's web blog

The reuse of treated wastewater in Agriculture

Technical Overview



OR



Biogas

Municipal W Water



The Reuse of TWW in Agriculture



Jordan: Biogas for Wastewater Treatment and Reuse in Agriculture **A PPP Model**

Jordan in utilizing of renewable energy for wastewater treatment at Khirbit As-samra wastewater treatment plant in Jordan which is reused in Agriculture

The business model is based on a Public Private Partnership (PPP) to finance the construction and operation of public infrastructures based on Build Operate Transfer (BOT) contract for 22 years.

The annual average energy consumption of the activated sludge system at Khirbit As-samra plant was around 61.58 GWh in 2014. The plant has achieved a self-energy sufficiency of 78-90% between 2009 and 2014.

This energy saving is achieved by utilizing renewable energy resources including hydraulic energy and biogas produced through anaerobic digestion.



Tunisia: Biogas for Wastewater Treatment and Reuse in Agriculture

Chotrana WWTP

TWW is reused to irrigate the largest irrigated area using TWW in Tunisia:
Borj Touil Area

(Private Farmers)
more than (3100 Ha)





**The Use of Solar Energy for
Groundwater Pumping in
Agriculture**



Why This Technology

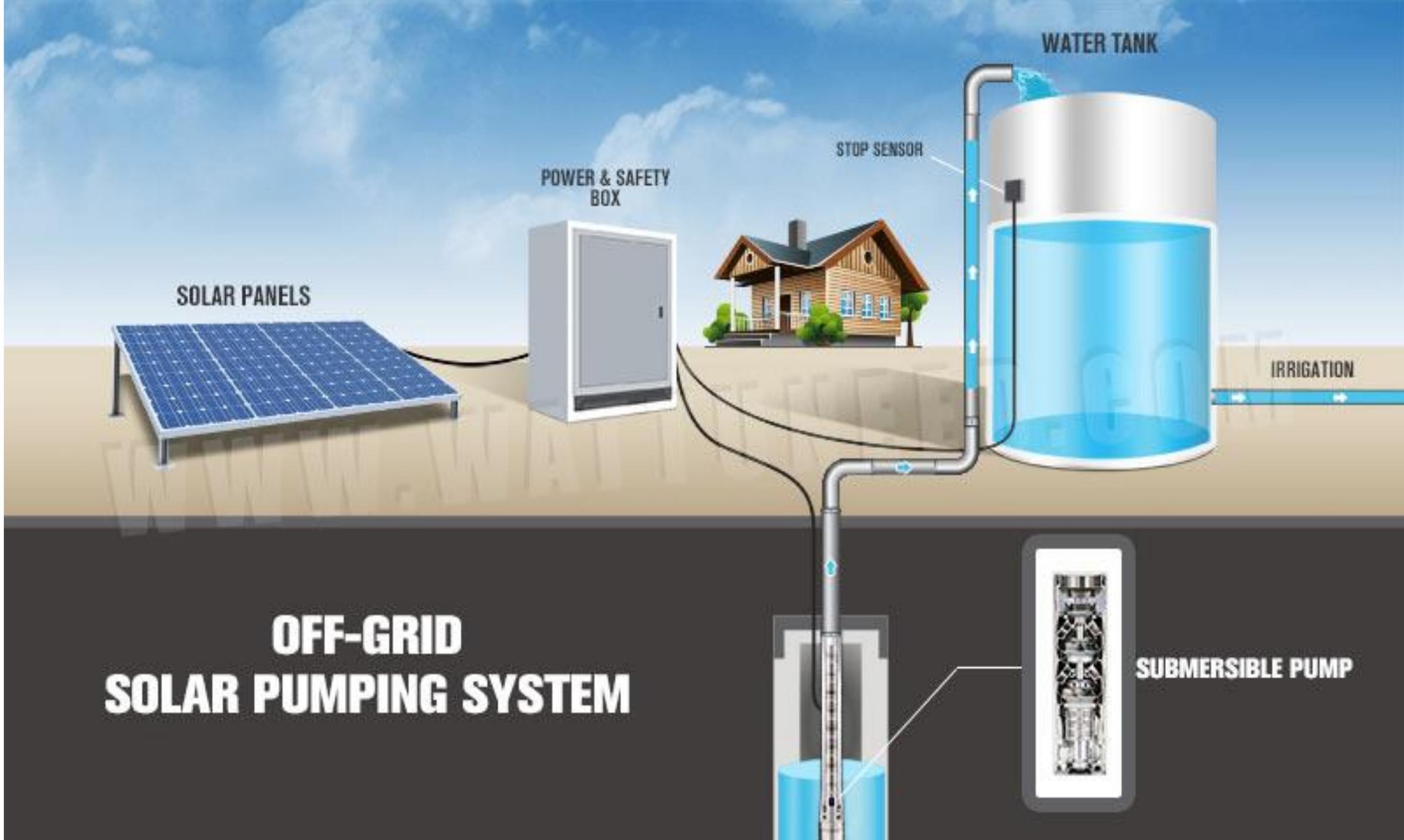


Rapidly growing prices for fossil pumping installations, with rapid and often radical phase-out of power and diesel subsidies for farmers and agro-industries across the region.

Growing supply bottlenecks in many countries of the region for diesel and power for on-grid pumps.

The extension of farming and hence irrigation into remote regions unconnected to the grid.

The quickly dropping costs of PV panels as well as the improved technical performances of the solar pumping technologies



OFF-GRID SOLAR PUMPING SYSTEM

SUBMERSIBLE PUMP

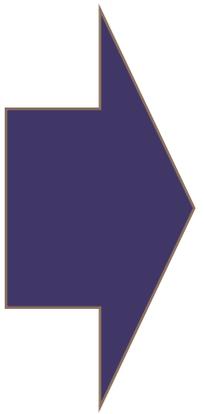
Impacts of SPIS: Benefits and Risks

Impacts of SPIS (Economic, job creation, farming competitiveness, smallholders, social, ...)

- ➔ Extremely low operating cost
- ➔ Comparatively low maintenance
- ➔ Simple and highly reliable systems
- ➔ Reduced dependence on electricity and fuel
- ➔ More income generating opportunities
- ➔ Mitigation and adaptation technology
- ➔ Reduce rural Migration
- ➔ Through the improved access to water resources, SPIS allow the development of unused agricultural areas at a reasonable price



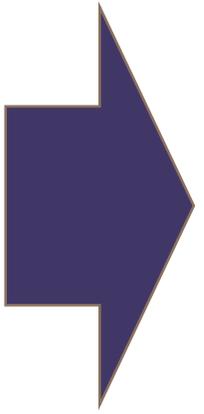
SPIS: Main risks



The Risk of Water Over-Abstraction

It is important to note that SPIS – if not adequately managed and regulated – bear the risk of supporting unsustainable water use.

The increased use of solar pumps might encourage greater water extraction and therefore lead to the over-exploitation of groundwater.



Other financial risks or challenges need to be addressed, such as:

- SPIS still requires a relatively high initial investment cost that smallholder farmers cannot afford. Small farmers also cannot tolerate the risk associated with the investment.
- Financing mechanisms are not accessible or affordable for all, especially for smallholders and tenant farmers

Economic Aspects of SPIS Systems

Economic Profitability of SPIS

Highly profitable compared to Diesel Pumps

Payback priode between (1 and 4 year)

Economic Profitability of SPIS

profitable compared to Conventional electricity

Payback priode between (5 and 7 year)

But...

SPIS: RE Subsidies VS Conventional energy Subsidies

Morocco : The illegal use of subsidized bottled butane by farmers, which is intended for domestic use, represents the biggest constraint to a large-scale deployment of solar pumping systems.

For small plots, the payback times are even **greater than 10 years, compared to butane and electricity for plots of less than 1 ha.**

Tunisia (Incentive mechanisms for SPIS vs Conventional electricity subsidies) Even with incentive mechanisms (direct subsidies) in place, **SPIS are not profitable compared to highly subsidized electricity for pumping and irrigation**

Incentive Mechanism for small scale renewable energies

(Comparative Analysis for Jordan, Lebanon and Tunisia)



Policy Analysis of Small scale renewable energies (Comparative Analysis for the Jordan, Lebanon, and Tunisia)



Jordan, Lebanon, and Tunisia all have clear energy policies with national objectives in the medium- and long-term, based mainly on large renewable energy projects (PV, wind).



Countries have identified set targets as part of their national renewable energy plans or sustainable energy strategies, be these medium-term (2020s) or long-term (2030s) targets.

However, none of these countries has a specific policy for the promotion of small-scale renewable energy as an income generation activity (for agriculture, water pumping, ...)

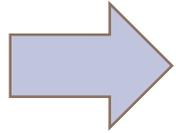
Incentive Mechanism Analysis of SPIS

Indirect Financial Subsidies : Fiscal incentives

(e.g. value added tax, customs duty exemptions) do exist for imported renewable energy equipment in all countries

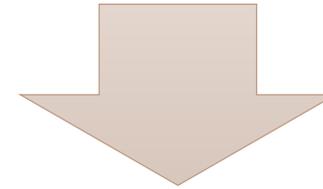
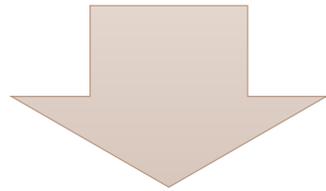


Direct Subsidy



Exp: Tunisia

Tow Incentive Funds



Energy Transition Fund

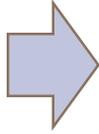
Tunisian Investement Fund

More Integrated Fund : Water,
Energy, Food ...

This model offer farmers more reliable and affordable energy + reduce power subsidy burden on government

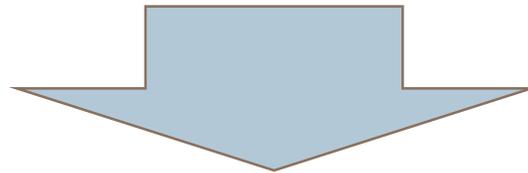
Because of the high investment cost Subsidies is not reaching small
Farmers

Non Subsidy/Open Market Model



EXP : Lebanon

Lebanon has a national financing mechanism initiated by the Central Bank of Lebanon (Banque du Liban-BDL) dedicated to the financing of green energy projects in Lebanon, the "National Energy Efficiency and Renewable Energy Action" (NEEREA). **green loans : is offered at an interest rate of 0.6% for period that should not exceed 14 years, including a grace period of 6 months to 4 years**



This model will guaranty the share of farmers in the investment and unfortunately it represents a barrier for small farmers. **Only big framers having financial facilities could have their projects.**

Financial Mechanism For Small scale Nexus Projects

Informal lending Mechanism to Finance Small scale Nexus Projects

Exp : In Egypt and Tunisia: SPIS financed by the SPIS supplier or through informal lending.



This can be convenient for farmers, who can pay at the end of the harvest time



But it is Used also to finance SPIS on illegal wells the case of Tunisia

Financial challenges & opportunities

For small scale Nexus Projects

- Many small farmers are not able to spare the cash to pay the higher initial investment of the SPIS..
- There is an absence of a specific, innovative and dedicated financial mechanisms for small-scale farmers and rural woman
- Local commercial banks have limited knowledge of the viability of small-scale renewable energy projects at the Local/Rural level
- Private banks might be unwilling to give cheap loans to small-scale farmers due to the high risks involved
- Absence of **micro finance and leasing institutions** in the financing of Nexus Projects
- Some rural areas are located very far away from bank branches, and some local farmers lack experience in dealing with banks and loans and therefore prefer informal saving schemes such as revolving funds or informal loans

Guidelines and Recommendations to promote Small scale Nexus Projects

Incentive mechanisms

-  Rethinking pricing schemes of the three resources needs to be undertaken in a holistic approach that takes into considerations the complexities of inter-linkages.
-  Encourage financial institutions to implement low interest loans and grants
-  Awareness and capacity building for banks and micro finance institutions
-  Reviewing subsidies system in order to include small farmers and rural women
-  Encourage the Use of the Leasing Mechanism (rent to own) for the finance of small scale RE systems



Shared Prosperity **Dignified Life**



Thank you

Khaled Bedoui, ESWCA Consultant