



Home Solar for Farmers

PROGRAM BRIEF

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Home Solar for Farmers Project Brief

1. Project Name

LOPAC Home Solar for Farmers Program

Working theme:

Energy from the sun for communication, safety and family life.

2. Project Purpose

The Home Solar for Farmers Program will provide participating farming households with a simple, affordable solar energy system capable of:

- Charging at least one mobile phone each day.
- Providing dependable lighting in the evening.
- Reducing reliance on kerosene, disposable batteries and paid phone-charging services.
- Improving household safety and convenience after dark.
- Supporting farmers' ability to communicate with LOPAC, buyers, extension officers and other farmers.
- Creating a foundation that can later be expanded to power additional lights, radios or other small devices.

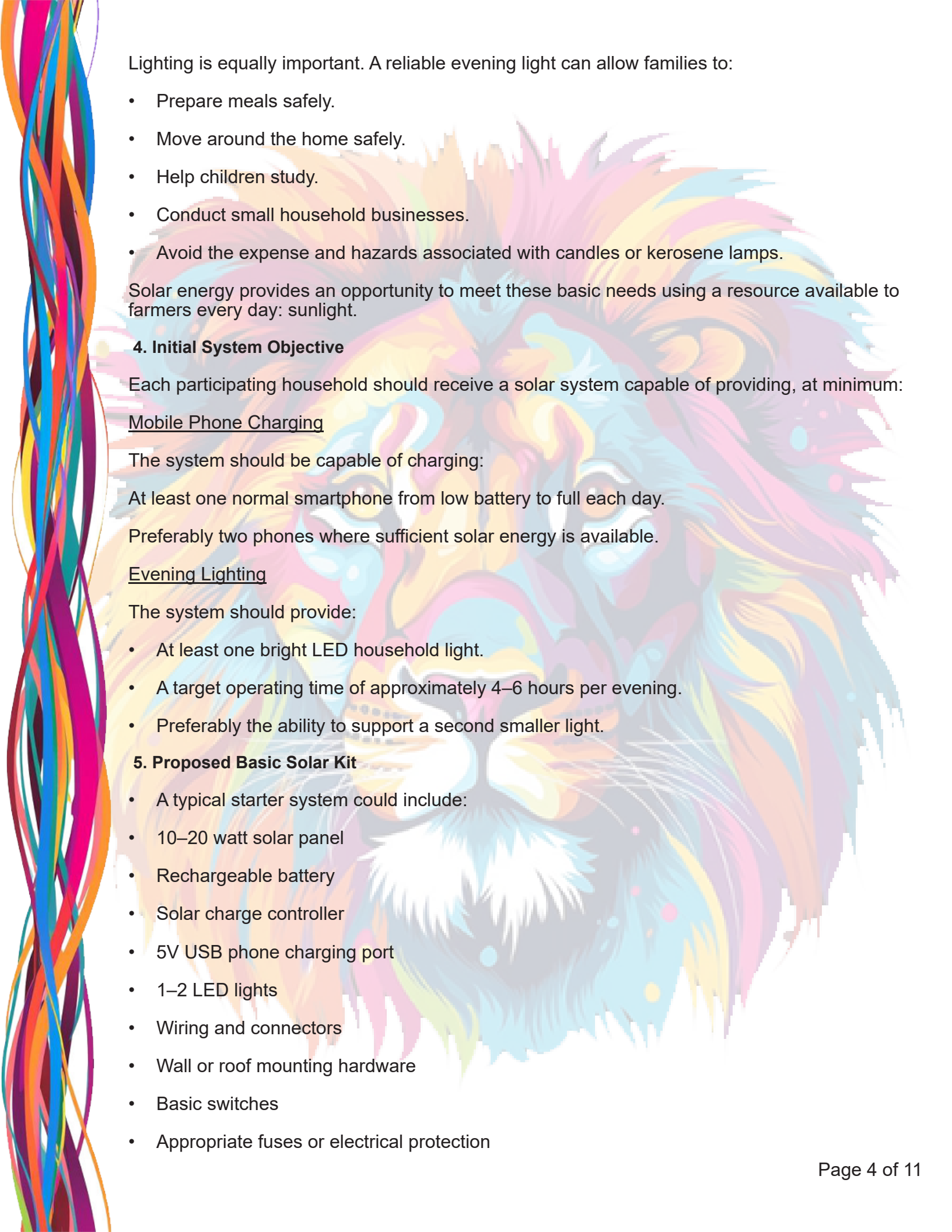
The goal is not initially to provide full household electricity. The goal is to provide a small amount of dependable electricity that delivers a significant improvement in everyday life.

3. Why the Project Is Needed

Many smallholder farming households either have limited access to electricity or must carefully manage the cost of electricity, lighting and mobile phone charging.

Mobile phones have become important farming tools. Farmers use them for:

- Receiving agricultural information.
- Communicating with buyers.
- Mobile money transactions.
- Coordinating transportation.
- Receiving weather information.
- Communicating with LOPAC.
- Emergency communication.



Lighting is equally important. A reliable evening light can allow families to:

- Prepare meals safely.
- Move around the home safely.
- Help children study.
- Conduct small household businesses.
- Avoid the expense and hazards associated with candles or kerosene lamps.

Solar energy provides an opportunity to meet these basic needs using a resource available to farmers every day: sunlight.

4. Initial System Objective

Each participating household should receive a solar system capable of providing, at minimum:

Mobile Phone Charging

The system should be capable of charging:

At least one normal smartphone from low battery to full each day.

Preferably two phones where sufficient solar energy is available.

Evening Lighting

The system should provide:

- At least one bright LED household light.
- A target operating time of approximately 4–6 hours per evening.
- Preferably the ability to support a second smaller light.

5. Proposed Basic Solar Kit

- A typical starter system could include:
- 10–20 watt solar panel
- Rechargeable battery
- Solar charge controller
- 5V USB phone charging port
- 1–2 LED lights
- Wiring and connectors
- Wall or roof mounting hardware
- Basic switches
- Appropriate fuses or electrical protection

- Simple operating instructions

A slightly larger 20–30 watt system should also be evaluated because the additional capacity may significantly improve reliability during cloudy periods while providing room for future expansion.

6. System Design Principles

The system should be designed around five principles:

Affordable

The system must be inexpensive enough that it can eventually be financed or purchased by ordinary farmer members.

Simple

Farmers should not require technical knowledge to operate the system.

Repairable

Individual components should be replaceable rather than requiring replacement of the entire system.

Expandable

A farmer who begins with one light and phone charging should eventually be able to add:

- Additional lights
- Radio
- Small rechargeable lantern
- Small fan
- Larger battery
- Larger solar panel

Durable

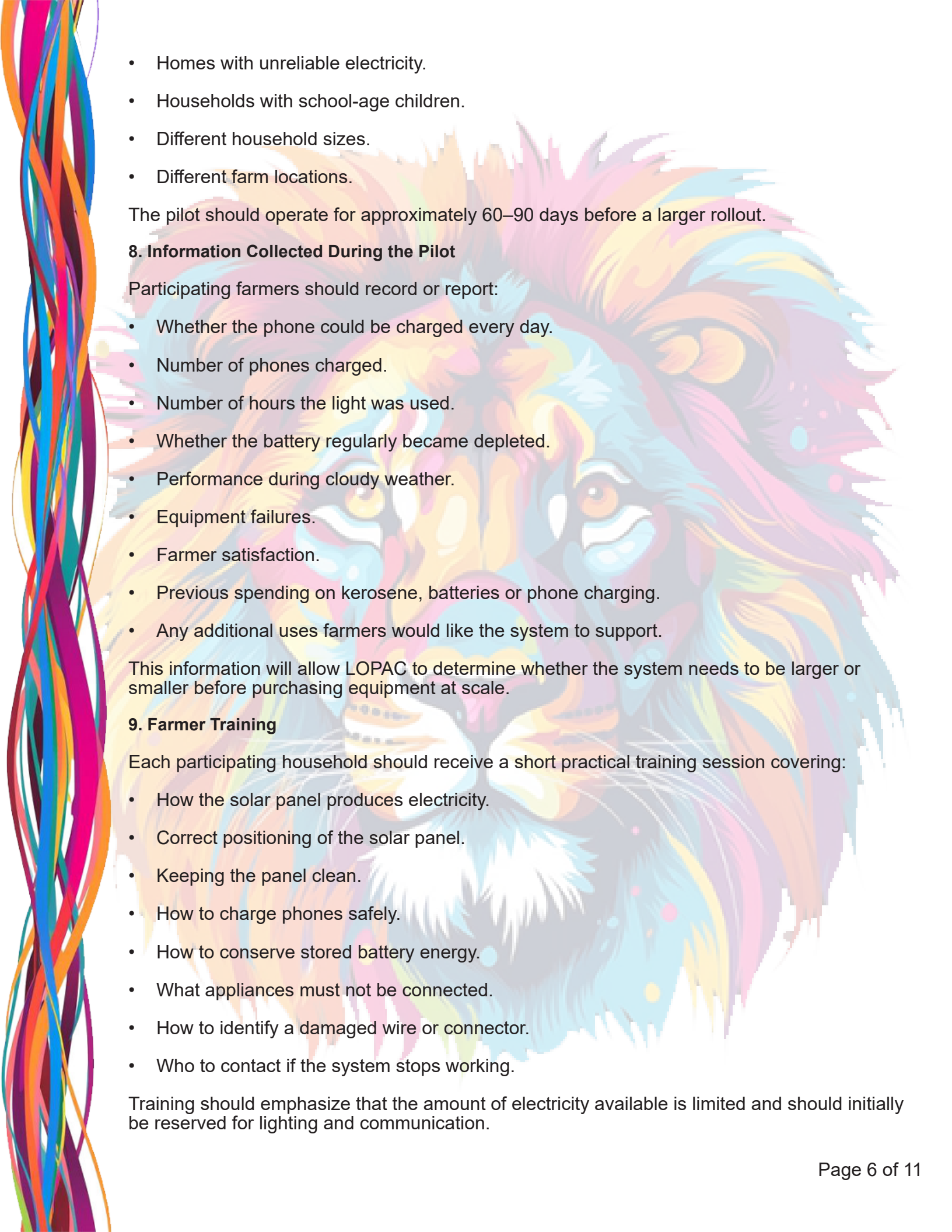
The equipment must withstand typical rural household conditions, including dust, heat, transportation and frequent daily use.

7. Pilot Phase

The program should begin with a small pilot rather than immediately purchasing systems for every farmer.

A suggested pilot would involve:

- 10 farming households
- The pilot households should represent different circumstances, including:
- Homes with no grid electricity.

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- Homes with unreliable electricity.
 - Households with school-age children.
 - Different household sizes.
 - Different farm locations.

The pilot should operate for approximately 60–90 days before a larger rollout.

8. Information Collected During the Pilot

Participating farmers should record or report:

- Whether the phone could be charged every day.
- Number of phones charged.
- Number of hours the light was used.
- Whether the battery regularly became depleted.
- Performance during cloudy weather.
- Equipment failures.
- Farmer satisfaction.
- Previous spending on kerosene, batteries or phone charging.
- Any additional uses farmers would like the system to support.

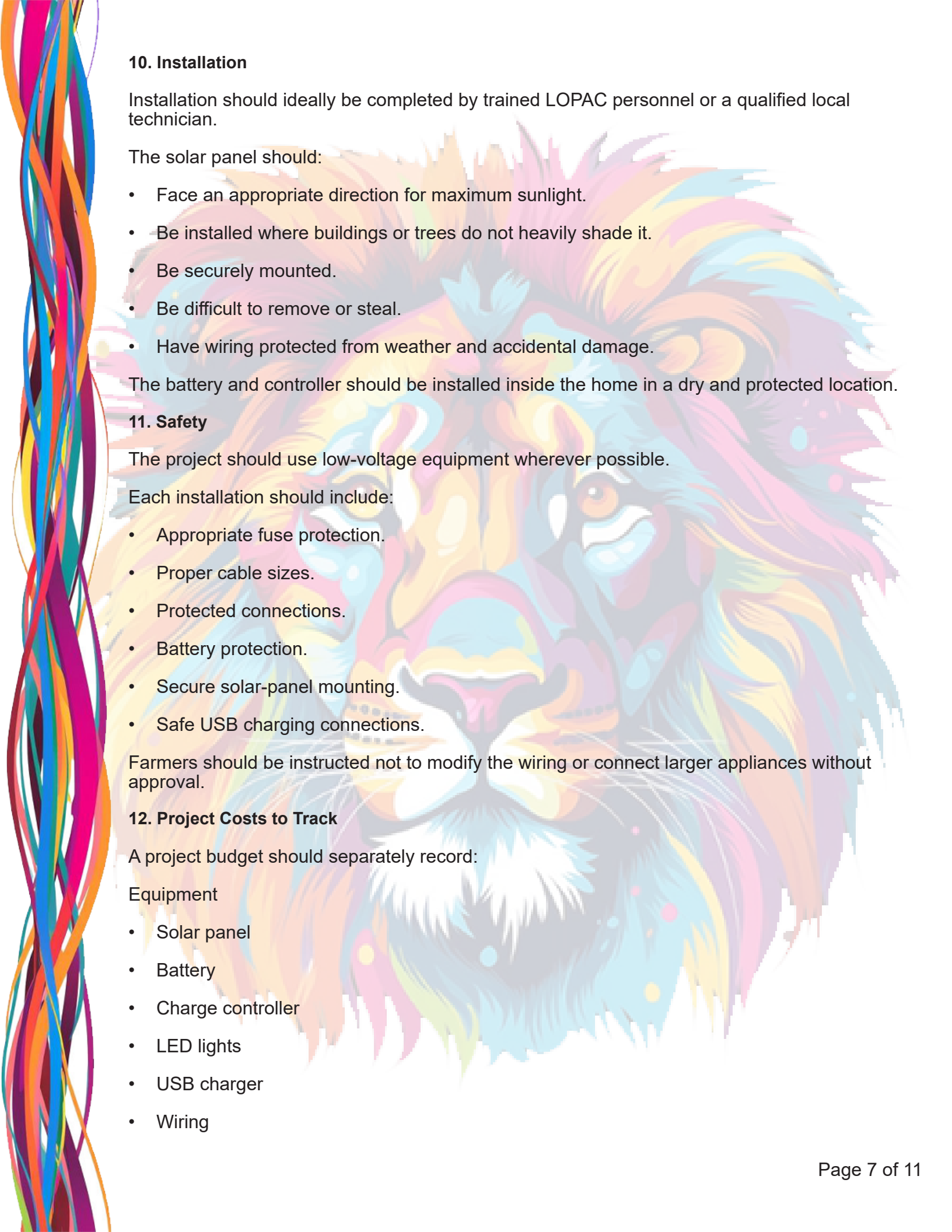
This information will allow LOPAC to determine whether the system needs to be larger or smaller before purchasing equipment at scale.

9. Farmer Training

Each participating household should receive a short practical training session covering:

- How the solar panel produces electricity.
- Correct positioning of the solar panel.
- Keeping the panel clean.
- How to charge phones safely.
- How to conserve stored battery energy.
- What appliances must not be connected.
- How to identify a damaged wire or connector.
- Who to contact if the system stops working.

Training should emphasize that the amount of electricity available is limited and should initially be reserved for lighting and communication.



10. Installation

Installation should ideally be completed by trained LOPAC personnel or a qualified local technician.

The solar panel should:

- Face an appropriate direction for maximum sunlight.
- Be installed where buildings or trees do not heavily shade it.
- Be securely mounted.
- Be difficult to remove or steal.
- Have wiring protected from weather and accidental damage.

The battery and controller should be installed inside the home in a dry and protected location.

11. Safety

The project should use low-voltage equipment wherever possible.

Each installation should include:

- Appropriate fuse protection.
- Proper cable sizes.
- Protected connections.
- Battery protection.
- Secure solar-panel mounting.
- Safe USB charging connections.

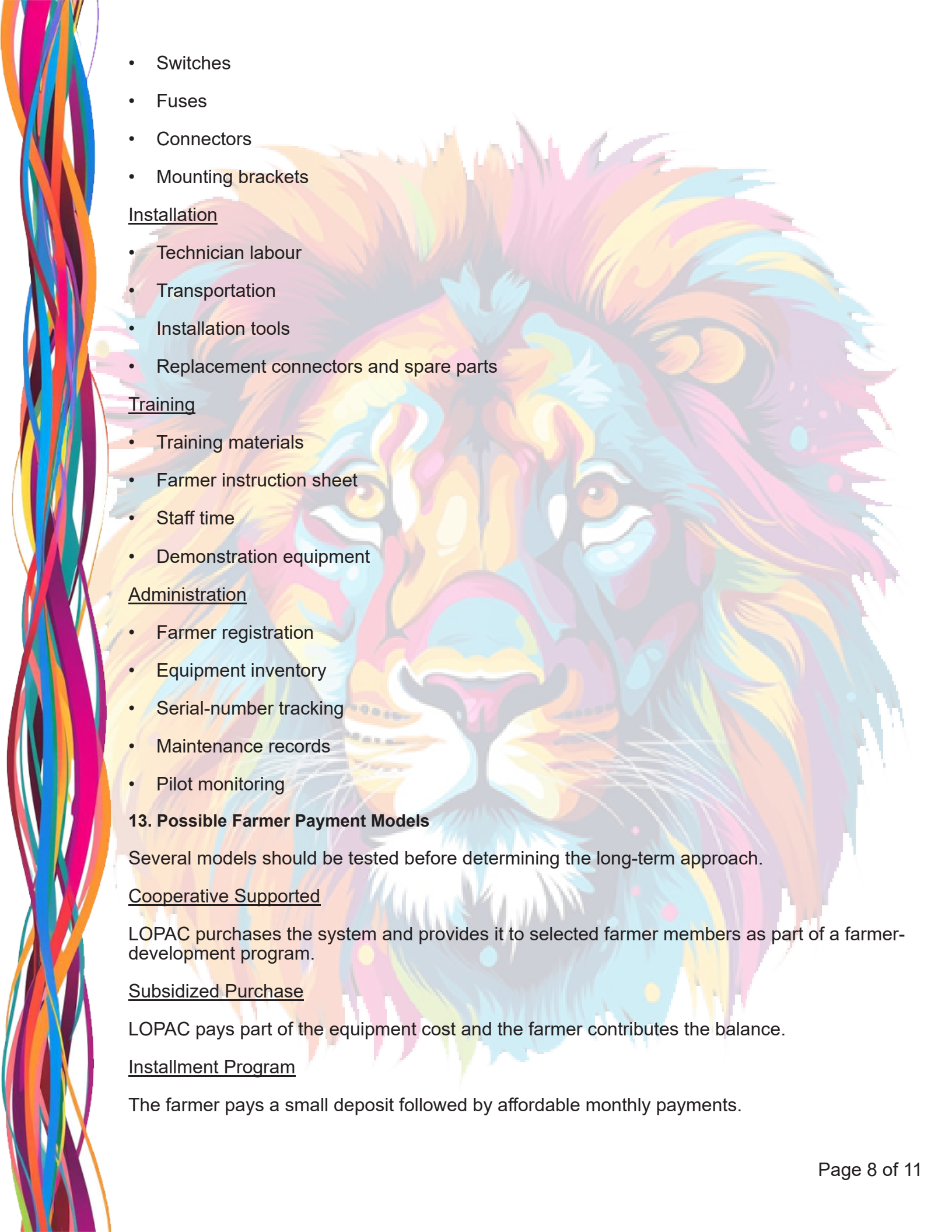
Farmers should be instructed not to modify the wiring or connect larger appliances without approval.

12. Project Costs to Track

A project budget should separately record:

Equipment

- Solar panel
- Battery
- Charge controller
- LED lights
- USB charger
- Wiring

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- Switches
 - Fuses
 - Connectors
 - Mounting brackets

Installation

- Technician labour
- Transportation
- Installation tools
- Replacement connectors and spare parts

Training

- Training materials
- Farmer instruction sheet
- Staff time
- Demonstration equipment

Administration

- Farmer registration
- Equipment inventory
- Serial-number tracking
- Maintenance records
- Pilot monitoring

13. Possible Farmer Payment Models

Several models should be tested before determining the long-term approach.

Cooperative Supported

LOPAC purchases the system and provides it to selected farmer members as part of a farmer-development program.

Subsidized Purchase

LOPAC pays part of the equipment cost and the farmer contributes the balance.

Installment Program

The farmer pays a small deposit followed by affordable monthly payments.

Harvest Deduction

The farmer receives the system at planting time and repayment is deducted from proceeds when LOPAC purchases the farmer's crop.

Solar Savings Program

Farmers contribute small amounts over time toward purchasing their own solar kit.

A harvest-linked repayment model may be particularly suitable because repayment occurs when the farmer has agricultural income rather than requiring large payments during the growing season.

14. Maintenance Program

LOPAC should avoid distributing solar systems without a maintenance plan.

A simple maintenance structure should include:

- Local spare parts inventory.
- Replacement USB ports and cables.
- Replacement LED bulbs.
- Wiring and connectors.
- Basic troubleshooting procedures.
- Battery replacement schedule.
- Trained local technician or LOPAC staff member.

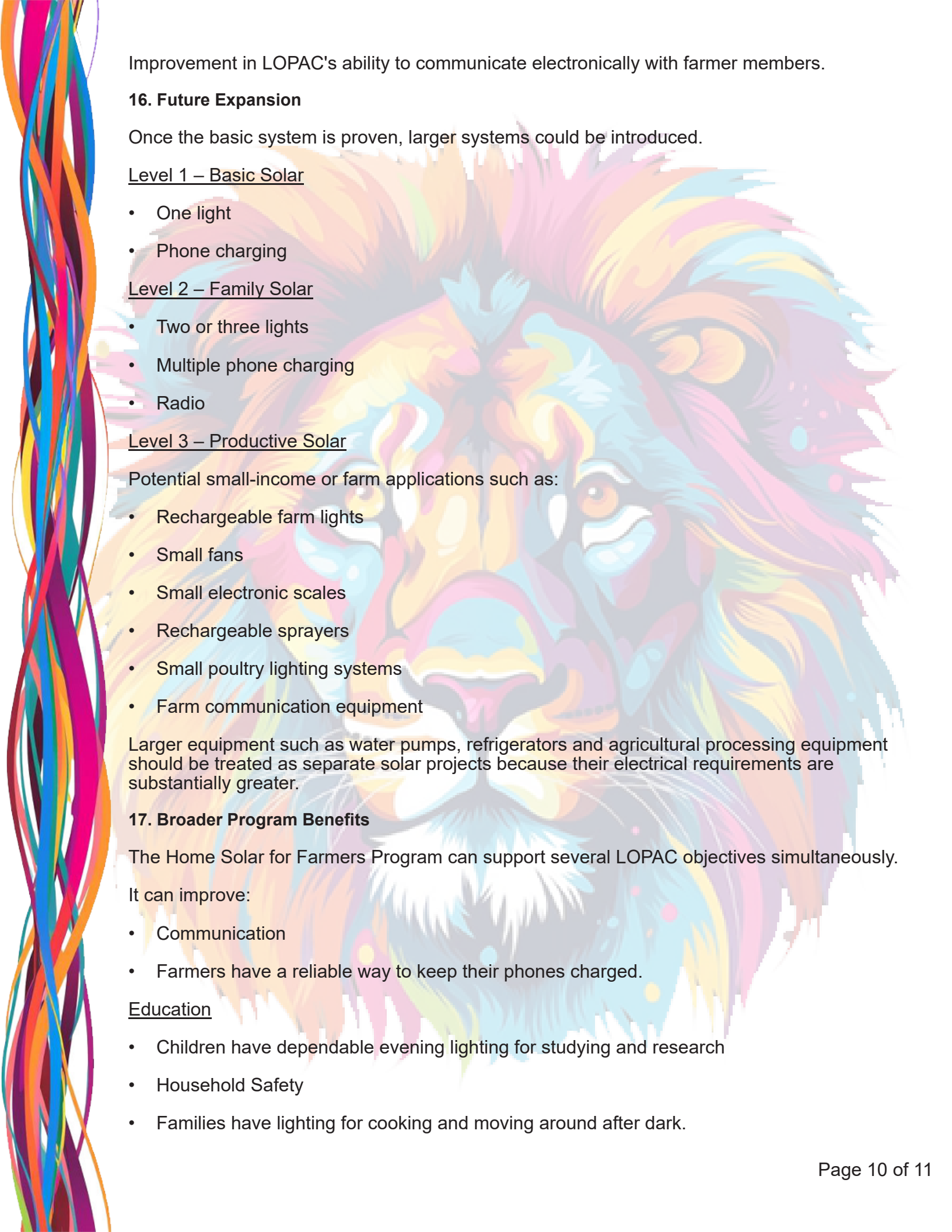
Each system should have a unique identification number connected to the farmer's record.

15. Measuring Success

The project should measure more than the number of solar panels distributed.

Important indicators include:

- Percentage of households able to charge a phone daily.
- Average hours of lighting available each evening.
- Reduction in household kerosene use.
- Reduction in money spent charging phones.
- Number of equipment failures.
- Average maintenance cost.
- Farmer satisfaction.
- Percentage of farmers wanting to expand their systems.



Improvement in LOPAC's ability to communicate electronically with farmer members.

16. Future Expansion

Once the basic system is proven, larger systems could be introduced.

Level 1 – Basic Solar

- One light
- Phone charging

Level 2 – Family Solar

- Two or three lights
- Multiple phone charging
- Radio

Level 3 – Productive Solar

Potential small-income or farm applications such as:

- Rechargeable farm lights
- Small fans
- Small electronic scales
- Rechargeable sprayers
- Small poultry lighting systems
- Farm communication equipment

Larger equipment such as water pumps, refrigerators and agricultural processing equipment should be treated as separate solar projects because their electrical requirements are substantially greater.

17. Broader Program Benefits

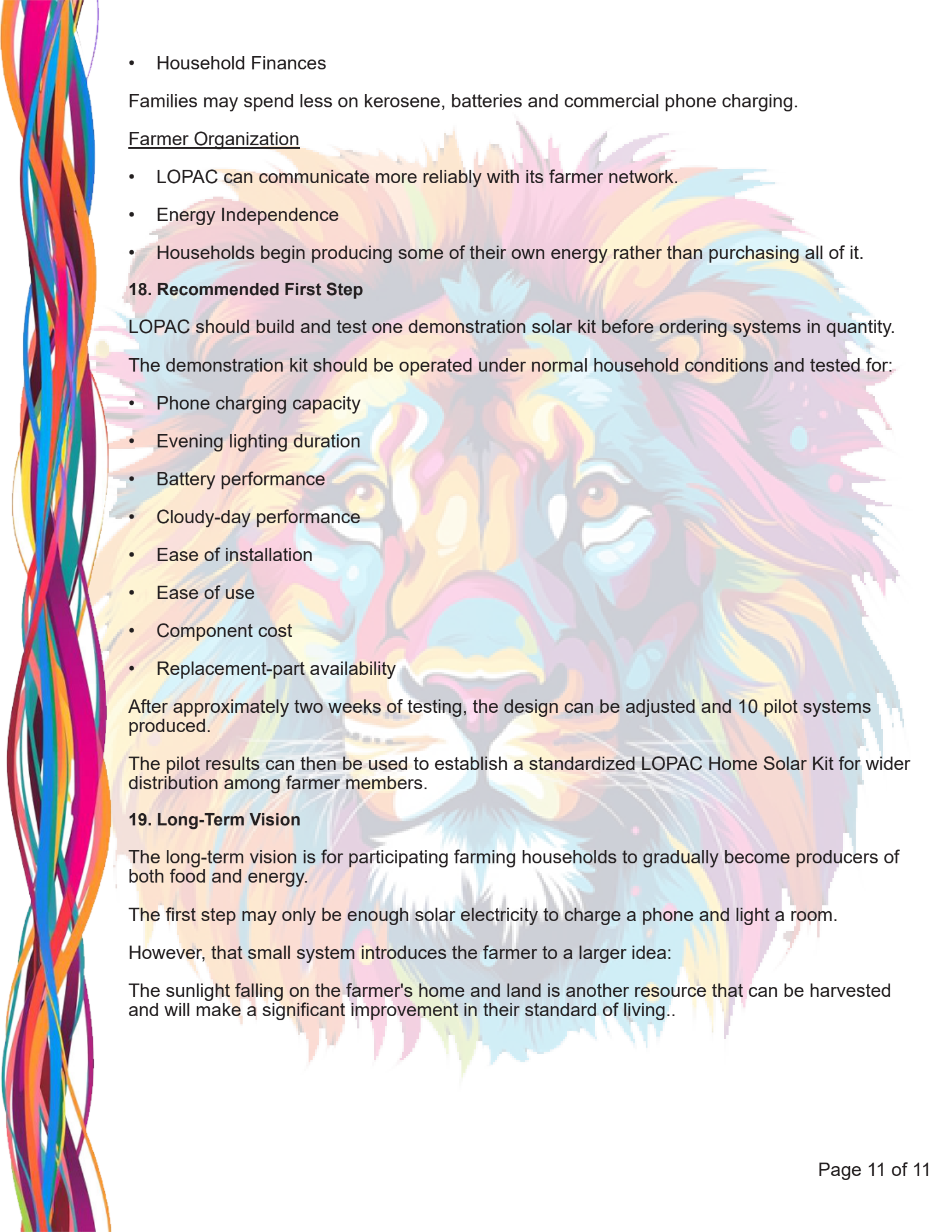
The Home Solar for Farmers Program can support several LOPAC objectives simultaneously.

It can improve:

- Communication
- Farmers have a reliable way to keep their phones charged.

Education

- Children have dependable evening lighting for studying and research
- Household Safety
- Families have lighting for cooking and moving around after dark.

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- Household Finances

Families may spend less on kerosene, batteries and commercial phone charging.

Farmer Organization

- LOPAC can communicate more reliably with its farmer network.
- Energy Independence
- Households begin producing some of their own energy rather than purchasing all of it.

18. Recommended First Step

LOPAC should build and test one demonstration solar kit before ordering systems in quantity.

The demonstration kit should be operated under normal household conditions and tested for:

- Phone charging capacity
- Evening lighting duration
- Battery performance
- Cloudy-day performance
- Ease of installation
- Ease of use
- Component cost
- Replacement-part availability

After approximately two weeks of testing, the design can be adjusted and 10 pilot systems produced.

The pilot results can then be used to establish a standardized LOPAC Home Solar Kit for wider distribution among farmer members.

19. Long-Term Vision

The long-term vision is for participating farming households to gradually become producers of both food and energy.

The first step may only be enough solar electricity to charge a phone and light a room.

However, that small system introduces the farmer to a larger idea:

The sunlight falling on the farmer's home and land is another resource that can be harvested and will make a significant improvement in their standard of living..