

SWOT analysis by adding mitigation measures for the weaknesses and threats

While the solar PV system offers significant benefits for the sustainable farm, it is important to acknowledge and address its weaknesses and threats. By implementing proactive mitigation measures, the farm can minimize risks, optimize system performance, and ensure long-term reliability. This section outlines strategies to overcome challenges such as weather dependency, high initial costs, maintenance requirements, and external threats like climate change and regulatory changes. These measures not only enhance the system's efficiency but also strengthen the farm's resilience and sustainability. Here's the updated SWOT analysis with mitigation measures:

Weaknesses

1. **High Initial Investment:** Seek government incentives, grants, or low-interest loans to reduce upfront costs. Explore leasing options or power purchase agreements (PPAs) to spread out payments.
2. **Weather Dependency** (e.g., reduced efficiency in hot weather): Install panels with a lower temperature coefficient to minimize efficiency losses in hot weather. Use cooling systems (e.g., water or air cooling) to keep panels at optimal temperatures.
3. **Maintenance Requirements:** Implement a regular maintenance schedule, including cleaning panels and checking inverters. Use automated cleaning systems or drones for large installations.
4. **Energy Losses** (e.g., shading, dust, or cable resistance): Install anti-shading devices (e.g., bypass diodes) and power optimizers to minimize losses. Use high-quality cables with proper sizing to reduce resistance. Regularly clean panels to prevent dust buildup.

Threats

1. **Climate Change** (e.g., unpredictable weather patterns): Design the system with resilience in mind, such as using durable materials and installing backup battery storage to ensure energy availability during extreme weather.
2. **Regulatory Changes**: Stay informed about policy changes and adapt quickly. Diversify revenue streams (e.g., crop sales, energy exports) to reduce reliance on subsidies.
3. **Natural Disasters** (e.g., storms, floods, or hail): Install panels with high wind and impact resistance. Use insurance policies to cover potential damage. Locate critical components (e.g., inverters) in protected areas.
4. **Technological Obsolescence**: Choose modular systems that allow for easy upgrades. Stay updated on emerging technologies and integrate them as they become cost-effective.