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Investing in rural people

President's report on a proposed grant under
the global/regional window to SunDanzer
International for Green Technologies to
Facilitate Development of Value Chains for
Perishable Crops and Animal Products

Note to Executive Board representatives

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For: Approval

Recommendation for approval

The Executive Board is invited to approve the recommendation for the proposed grant as contained in paragraph 22.

President's report on a proposed grant under the global/regional window to SunDanzer International for Green Technologies to Facilitate Development of Value Chains for Perishable Crops and Animal Products

I. Background and compliance with IFAD Policy on Grant Financing

1. For rural smallholders, energy is a critical bottleneck to increasing productivity and reducing post-harvest losses. Prices of renewables have dropped dramatically; at the same time, cost-effective technology solutions have been developed with support from donor funding. Now is a good time to apply renewable-energy technologies to value chain projects for both piloting and scaling up.
2. Although there are many technologies currently available for chilling perishable agricultural products, most of the available solutions require batteries for storing energy during hours when the sun is not shining. Lead-acid batteries' roundtrip energy efficiency is only 75 per cent at best and batteries are the largest component of system cost, often costing more than the refrigerators themselves. They also require proper operation and maintenance to retain their ability to charge properly. Short-circuiting and over-discharge of batteries, which can end a battery's life early, are common problems. Refrigeration systems are therefore expensive to operate and are often abandoned when it is time to replace their batteries.
3. The grant recipient, SunDanzer, was selected through a competitive process using an open call based on a concept note approved by IFAD's Operational Strategy and Policy Guidance Committee. Through the Green Technologies to Facilitate Development of Value Chains for Perishable Crops and Animal Products programme, the SunDanzer team, in collaboration with partner Winrock International, proposes to build on SunDanzer's existing direct-drive (battery-free) refrigeration technologies, adapting them to the needs of smallholders in Malawi, Mozambique, Rwanda, Tanzania and Zimbabwe. Direct-drive chillers are cost effective and the increased income generated by the chillers means that while smallholders may require financing to purchase them, they do not require subsidies. SunDanzer's direct-drive solar chillers are based on technology developed by the United States National Aeronautics and Space Administration (NASA) and licensed to SunDanzer, and have been in use by the United Nations Children's Fund (UNICEF) since 2010 for vaccine refrigeration. Instead of electrochemical batteries for energy storage, these units use a phase change material ("blue ice") that freezes at 2°C so that vaccines cannot be frozen, which would damage them. The units remain cold for up to one week of consistently cloudy weather.
4. The proposed programme is in line with the goal and objectives of the 2015 IFAD Policy for Grant Financing.¹ The programme will support Strategic Objective 1: increase poor rural people's productive capacities, by supporting direct-drive solar chilling that can directly increase productive capacity by significantly decreasing

¹ See EB 2015/114/R.2/Rev.1.

post-harvest losses. In addition, it is affordable as long as financing is accessible; pay-back time is less than one year. It will also support Strategic Objective 2: increase poor rural people's benefits from market participation. The programme will support direct-drive solar chilling that enables poor rural people to participate in markets by allowing them to consistently produce a greater volume of high-quality perishables with significantly decreased risk. Lastly, it will contribute to Strategic Objective 3: strengthen the environmental sustainability and climate resilience of poor rural people's economic activities by supporting direct-drive solar chilling technology that does not require batteries or fuel like diesel generators or solar chillers.

II. The proposed programme

5. The overall goal of the programme is to strengthen smallholders' capacities to enhance food security and nutrition by sustainably reducing post-harvest losses, while enhancing market opportunities for their produce. The outcomes sought by the programme are: a sustainable reduction in post-harvest losses; and enhanced market opportunities for smallholder producers in the five target countries.
6. The target group will be comprised of: smallholder dairy farmers with at least three cows; milk collection points; satellite milk-chilling centres; poor people involved in fishing and related activities; fish transporters; and all smallholder farmers in the irrigation-cluster areas, with a focus on productive poor smallholders engaged in irrigated agriculture. The programme will reach a total of 2,500 direct and 10,000 indirect beneficiaries.
7. The programme will be implemented over three years and will have the following components:
8. Component 1: Identify key bottlenecks that contribute to post-harvest losses in perishable supply chains. The programme will verify the needs of the selected milk, fish and horticulture value chains for cold chain requirements to determine the required technologies. This will be followed by knowledge, attitudes and practices surveys to determine chilling solutions and consumer perceptions for each commodity in the selected countries. Results of the survey will be used to identify existing green technologies or those that can be developed.
9. The findings from the smallholder cold chain needs assessment and knowledge, attitudes and practices surveys will be used to assess the feasibility of adapting existing solar chilling technologies to each value chain and creating specifications for new products. The result will be a menu of products that are tailored to the targeted smallholders in each value chain. The programme will tailor technology development to meet the needs of target groups such as dairy farmers and fishers.
10. Component 2: Identify, adapt, design and develop context-appropriate technologies and strategies that maximize efficiency in perishable supply chains. The programme will assess existing in-country cooling techniques and renewable energy technologies for chilling milk, fish and horticulture, and will use the assessment to identify renewable energy technology solutions that fill identified gaps. For fish and bulk milk chilling, solar systems with batteries may be required; the programme will evaluate the additional costs and maintenance required for these systems to ensure that they still benefit smallholders. The programme will also adapt and test solar drying technologies for food preservation such as the technology developed in Afghanistan for indirect solar food drying, which dries faster and has better color and vitamin retention.
11. In addition, the programme will identify in-country cold storage manufacturing capacity for produce cooling, and assess solar panel

availability, mounting structure fabrication and installation capabilities in all five target countries.

12. Component 3: Capacity building and facilitating access to market linkages. The programme will provide training to all stakeholders on the proper use of the solar chilling technology. Training will target women farmers and fishers engaged in post-harvest activities. This will involve active outreach to women farmers and youth for capacity-building activities, with a target of women comprising 40 per cent of those trained and young people under 25 years old comprising 25 per cent. The programme will record the names, ages, and gender of all trainees, and include summary training reports with photos and sign-in sheets.
13. The programme will work with milk, fish, and horticulture cooperatives, microfinance institutions, and savings and credit cooperative organizations to facilitate financing. Solar chilling technologies require both fiscal and financial incentives for widespread adoption by smallholder dairy and horticulture farmers, and artisanal fishers. Customs and taxes on imported equipment – common in several of the target countries – often place unnecessary price burdens on smallholders who could benefit from these technologies. The programme will collaborate with other IFAD-funded projects and with the Food and Agriculture Organization of the United Nations (FAO) to share the results of economic analyses of solar chilling technologies with policy makers and other government officials in order to make the case for governments to extend these incentives.
14. Component 4: Knowledge sharing and learning. Return on investment case studies focused on participating smallholders will be carried out to understand their profits and losses before and after acquiring a solar chiller. The programme will work with IFAD to disseminate results and lessons learned, including return on investment information, through the FAO-hosted Community of Practice web platform on post-harvest food loss.² The programme will share knowledge on design and results both regionally and globally, including data on solar chilling performance, return on investment and market growth.

III. Expected outcomes/outputs

15. The programme is expected to generate global innovations in the off-grid cold chain and value-adding green technologies identified, adapted and piloted. Programme outputs will include the following: (i) key constraints contributing to post-harvest losses for milk, fish, and horticulture crops in target countries assessed; (ii) commercial producers of other green technologies (such as solar dryers) identified to scale up production and distribution; (iii) results of pilots evaluated and disseminated; (iv) policy requirements for scaling up identified; (v) road maps prepared to promote and support local technology value chains, with a focus on long-term sustainability; (vi) best practice guidance materials for donors, policy makers, regulators and implementers developed, disseminated and used to contribute to international dialogue on smallholder agricultural development; and (vii) lessons learned documented and widely distributed.
16. SunDanzer will provide a list of any intellectual properties developed using IFAD funding (“the technology”) and provide it to IFAD at the end of the contract period. IFAD acknowledges that before the start of this contract, SunDanzer has operated solar and solar direct-drive cooling products, including products incorporating licensed technology, which are used for produce storage.

² The Community of Practice is one of the major outcomes of Mainstreaming Food Loss Reduction Initiatives for Smallholders in Food-Deficit Areas, the first joint programme implemented by FAO, IFAD and the World Food Programme (WFP), and funded by Swiss Agency for Development and Cooperation.

17. If SunDanzer fails to commercialize the technology, SunDanzer will grant to IFAD transferable and unlimited rights license to use the technology at no cost. "Failure to commercialize" is defined as cumulative sales of less than US\$250,000 at the end of the 24-month period after the contract is completed, or sales of less than US\$200,000 in any subsequent year. Cumulative sales will include approximately 40 per cent from rural smallholder farmers and traders.

IV. Implementation arrangements

18. For cost and management efficiency, SunDanzer proposes a small, flexible implementation team that can respond to varying country and sector needs, and build on existing IFAD-funded programme implementation arrangements in the target countries. To ensure rapid programme mobilization and implementation, the team includes programme management and technical experts who have worked together on similar green technology and value chain projects in East Africa. Aligning with the partners' technical strengths and experience, SunDanzer will lead the technology work for component 2 and Winrock will lead the supply chain, capacity-building and knowledge-management activities for components 1, 3 and 4. Winrock will also engage local universities to support monitoring and evaluation, as it has done in Kenya. SunDanzer will design, develop and deliver the proposed technology to the target countries. Winrock will lead the execution of the programme and fieldwork within the target countries.
19. The team will consist of a programme supervisor, programme manager, renewable energy/training expert, solar/chiller engineers, an international dairy expert and three local value chain experts for dairy, fish and horticulture. SunDanzer and Winrock will provide additional backstopping support from their headquarters for grant agreement, financial and administrative oversight, and compliance.
20. There are no deviations from the standard procedures for financial reporting and audits. SunDanzer is a privately held for-profit corporation and is not required to conduct annual audits. Nevertheless, SunDanzer will engage a certified public accountant to prepare consolidated financial reports for the IFAD-financed programme, which will be audited by independent external auditors.

V. Indicative programme costs and financing

21. The total cost of the programme is US\$2,640,000, of which US\$2,200,000 will be financed by IFAD and US\$440,000 will be cofinanced by the recipient and its partner Winrock International.

Table 1
Costs by component and financier
 (Thousands of United States dollars)

<i>Components</i>	<i>IFAD</i>	<i>Cofinancing</i>	<i>Total</i>
Component 1: Identify key bottlenecks contributing to post-harvest losses in perishable supply chains	225	20	245
Component 2: Identify, adapt/design, develop technologies/strategies to maximize efficiency in perishable supply chains	1191	320	1511
Component 3: Capacity building/facilitating access to market linkages	448	80	528
Component 4: Knowledge sharing and learning	173	20	193
Overheads	163	-	163
Total	2200	440	2640

Table 2
Costs by expenditure category and financier
 (Thousands of United States dollars)

<i>Expenditure category</i>	<i>IFAD</i>	<i>Cofinancing</i>	<i>Total</i>
1. Salaries and allowances	507	60	567
2. Operating costs	30	-	30
3. Consultancies	221	-	221
4. Travel and allowances	145	20	165
5. Goods, services and inputs	940	320	1260
6. Workshops and training	194	40	234
7. Management fees/overheads	163	-	163
Total	2 200	440	2 640

VI. Recommendation

22. I recommend that the Executive Board approve the proposed grant in terms of the following resolution:

RESOLVED: that the Fund, in order to finance, in part, the programme on Green Technologies to Facilitate Development of Value Chains for Perishable Crops and Animal Products, shall provide a grant of two million two hundred thousand United States dollars (US\$2,200,000) to SunDanzer International for a three-year programme upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board herein.

Gilbert F. Hougbo
 President

Results-based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Goal	Strengthened capacity of smallholders to contribute to food security and nutrition	Key indicators for this goal include: Product sales, Post-harvest loss reduction Increased producer income	Sources of information for measuring progress against indicators include: Sales data Training records Field surveys	Political stability in the project countries; Host IFAD projects will meet their overall goals; Stable markets for the major agricultural products supported by targeted IFAD projects;
Objectives	Sustainable reduction in post-harvest losses and enhanced market opportunities for smallholder produce in the five target countries Market opportunities for smallholder producers enhanced	>20% increase in products sold annually attributed to solar chilling technologies. Producer sales (\$) increased.	Sources of information for measuring progress against indicators include: Farmer cooperative sales records Installation and maintenance records	External conditions to take into consideration that can affect the achievement of objectives include: Market conditions and product prices; climate/weather (e.g., drought); Inflation; Exchange rates.
Outcomes	Global innovations in off-grid cold chain and value-adding green technologies identified, adapted and piloted Renewable energy use in agriculture cold chain laws and policies reviewed.	>304 solar chiller units piloted, disaggregated by sector, country, and gender. At least 5 laws, policies, strategies, plans agreements or regulations implemented addressing cold chain and/or renewable energies	Sources for measuring progress against indicators include: Farmer/Cooperative sales data, Training records and attendance sheets, Smallholder user surveys, Regulatory rules by country.	External conditions impacting schedule include: Overseas shipping; Warehousing; Customs clearance; Import taxes; Local transport/roads.
Key Activities by component	C1 Activity 1: Identify technical and logistical bottlenecks in supply chains in target countries Activity 2: Conduct Knowledge, Attitudes and Practices (KAP) surveys in each of the target countries	5 x supply chain reviews completed. 5 x KAP surveys completed	Sources of information for measuring progress against indicators include: Equipment distributor records: Hardware Deployed Farmer/Coop Product Sales	Pre-conditions that must be met first include: Market conditions allow farmers and fishermen to sufficiently increase incomes from the use of

Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
C2 Activity 3: Prepare options for technical solutions for the development of green technologies suitable for smallholder farmers in each of the target countries	2 established dealers in the region supply each of the five countries (sales & maintenance)	records, Processor purchase records, Shipping/Installation records, Tax records.	solar chillers to fully or partially recover their capital costs
Activity 4: Conduct market assessment to identify available technologies suitable for target countries	5 x Market assessment for fish (Mozambique), milk (Tanzania and Rwanda) and Horticulture (Malawi and Zimbabwe) completed.		
Activity 5: Redesign existing global innovations or prepare new designs for the development and field piloting and testing of appropriate technologies for smallholder farmers	3 new/adapted technical designs prepared.		
C3 Activity 6: Provide hands-on training and outreach to targeted stakeholders during piloting of solar chilling technologies	Training and technical information provided to policy makers		
Activity 7: Provide training to develop the technical, business and negotiation skills of targeted stakeholders.	500 smallholders (operators and end users) trained on cold chain technologies, disaggregated by sector, country, and gender. 2,400 direct and 9,600 indirect beneficiaries of solar chilling technology, disaggregated by sector, country, and gender.		
C4 Activity 8: Evaluate and disseminate key lessons through FAO hosted Community of Practice (COP) web platform on food loss	5 x lessons learnt documents uploaded on food losses COP web platform		
Activity 9: Country- and regional-level workshops to present the results, lessons learned and scaling up strategy	2 workshops organized and implemented		

Financial Governance

Given the selection of a private sector entity as the recipient (see appendix II for details on the competitive selection process), the strictest financial management and governance frameworks are being set in place. These will ensure that IFAD resources are being used most efficiently to achieve the objectives of the project. This appendix covers some details on: a. financial management overview, b. procurement procedures, c. financial management systems, and d. audit arrangements.

a. Financial management

Financial Management. The programme financial management arrangements and internal control systems will be designed to satisfy IFAD's minimum requirements to provide accurate and timely information on the progress of programme implementation and guarantee the separation of functions through several levels of independent controls to implement appropriate risk mitigation measures to ensure accountability of funds.

A separate grant designated account will be opened for the programme in USD at Bank of America to receive funds from IFAD and will be managed by SunDanzer.

The Winrock International will open a separate operating (imprest) account in USD to receive funds from the SunDanzer operating account, based on expenditure forecasts and a Subsidiary Agreement with SunDanzer. All payments for eligible expenditures to be incurred by Winrock International under the approved budget will be made from this bank account.

b. Procurement procedures for goods, services and human resources

SunDanzer has detailed Procurement Procedures under our ISO 9001:2008 certification for the purchase of goods, services, and personnel resources. The responsibility for these procedures resides with the Purchasing Manager, and in their absence, the General Manager. The procedures involved in the procurement process included:

- a) **Competitive Bidding and Selection of New Suppliers:** New goods and services are competitively bid. Suppliers are evaluated and approved using an Approved Supplier Evaluation Form. The form evaluates price, terms, lead time, location, and time in business, personal relationships between the supplier and SunDanzer employees, and alternative suppliers.
- b) **Annual Supplier Review:** Suppliers providing goods or services >\$10,000 per year are reviewed annually. Review includes initial selection criteria as well as on-time delivery, defects, and going concerns.
- c) **Production Planning:** SunDanzer holds weekly management meetings to evaluate inventory levels against planned production rates and sales forecasts. Planning reports including QuickBooks and Excel documents taking into consideration quantities on-hand, on purchase order, minimum order quantities and vendor lead times. Purchases are approved by the Purchasing Manager and processed by the Accounting Department.
- d) **Purchasing:** SunDanzer uses an automated purchase order system in QuickBooks. Purchase Order approval is based on dollar thresholds and/or unusual in nature of purchase.
- e) **Verification of Purchased Goods and Services:** Received goods are inspected for damage and quantities and descriptions agreed to the Purchase order and Packing

List. Approved if no discrepancies are noted. If goods are non-conforming, a separate procedure is followed.

SunDanzer also has detailed human resources procedures. Hiring decisions are based on job openings and fulfillment using performance based job descriptions. Employees receive on-going and as needed training as suited to their professional responsibilities. Annual reviews are conducted for all levels and job counseling, as needed. SunDanzer also contracts with third-party temporary agencies, as needed.

Agreements establish rates of pay, basic qualifications by function, hiring, and release of temporary employees.

c. Financial Management System, including accounting specifications

SunDanzer uses QuickBooks Enterprise v. 17.0 for its automated financial record keeping. User access is controlled through the User Roles functionality, which may only be set and changed by the owner of the Company. Company divisions are tracked by class (i.e., Commercial, Medical, Household, and Military) and location (i.e., Tucson, AZ and El Paso, TX).

SunDanzer follows US Generally Accepted Accounting Procedures (GAAP). As a small business with limited accounting personnel to provide a fully complimented segregation of duties, SunDanzer has a third-party accountant, Better Office SolutionS (BOSS). BOSS reconciles the banking and checking accounts, processes payroll, prepares quarterly and annual government filings, prepares tax returns, and provides general accounting advisement. The outside accountant has remote access to SunDanzer's QuickBooks software to perform these procedures. These functions and relationship make BOSS a critical part of SunDanzer's overall accounting, internal controls, and organization structure.

SunDanzer has established comprehensive accounting procedures. These procedures address the process and the authorization to perform such functions as customer invoicing, vendor purchasing, payroll processing, inventory items, and journal entries. SunDanzer procedures submitted for consideration.

SunDanzer has monthly Company financial review meetings. During the meeting, management reviews 12-month revenue and expense trends by location and class. KPI's are also reviewed including monthly net cash flow, breakeven, gross margin profitability, and financial ratio (e.g., liquidity, accounts receivable and payable turn, inventory balance and turn, return on assets). Product sales by customer and item are reviewed and any delinquent accounts discussed and actioned.

d. Audit arrangements

SunDanzer is a privately held S-Corporation and is not required to conduct annual audits. SunDanzer has not entered a current or past contract requiring performance of a third-party audit. SunDanzer has engaged a CPA in the past to prepare consolidated financial reports for our UN customer UNICEF.

SunDanzer has been ISO 9001:2008 certified since 2013. SunDanzer has detailed ISO procedures and forms in place for accounting, administration, engineering, human resources, production, purchasing and quality control. SunDanzer performs periodic internal audits and has an annual audit. SunDanzer has not received Corrective Actions from these audits. SunDanzer plans to migrate to ISO 9001:15001 this fiscal year.

SunDanzer holds a US\$1M line of credit with Bank of America. Under the covenants of this agreement, SunDanzer submits company financials every six months. In addition, the owner's personal financial statement is submitted. The Bank also received all Corporate and Personal tax returns for their annual review. SunDanzer has never been in default of any loan covenants since the loan origination in March 2013. With these lines, SunDanzer has sufficient resources to draw upon to manage a suggested disbursement schedule to be 75% of AWPB. Subsequent disbursements will be requested upon any previous advances justification.

SunDanzer's accounting system has detailed and timely reporting capabilities to provide relevant and transparent financial reports to IFAD and stakeholders, at least semi-annually. Transaction details may be reported by summarized cost centers and detail transaction list.

As part of this program, SunDanzer will hire a third party auditor to perform annual audits of the project fund. The audit will be conducted in a manner consistent with IFAD's Guidelines on Project Audits. Tucson, AZ hosts a competitive selection of accountants registered with the AICPA to draw upon to meet specified qualifications to carry out the annual audit. The auditors terms of reference will be subject to IFAD clearance.

Overview of selection process and rationale for selection of private sector recipient

Overview of selection process and rationale

1. This was an open competitive process whereby applicants responded to a call for proposal, posted on the IFAD website, firstly by submitting an expression of interest and thereafter a full proposal. The call for proposal was open for one month between May and June 2017. A three-week question period was opened after the launch of the call. As most applicants were missing one or more pieces of documentation (audit reports, evidence of legal status etc.), they were given the possibility to submit additional documentation. An email to this regard was sent on to the nine applicants that had submitted a full proposal, giving them 24 hours to submit missing documentation.
2. The evaluation team and observer panel were set up with representation from, the technical advisory division (PTA), financial management (FMD), legal (LEG) and procurement colleagues.
3. Nine proposals were received from the following bidders by the closing date (proposals shared with panel and observers):
 - f) Rwanda Consumer's Rights Protection Organization (ADECOR)
 - g) African Organic Network (AfrONet)
 - h) African Institute of Corporate Citizenship (AICC)
 - i) Albertine Rift Biotechnology Development Agency (ARBA)
 - j) Eastern Province Animal Genetic Improvement Cooperative (ERAGIC)
 - k) IMBARAGA Farmer's Organisation
 - l) SunDanzer**
 - m) World Vision Rwanda
 - n) Youth in Agriculture for Economic Development (YAED)
4. The proposals from Afronet, AICC, ARBA, ERAGIC, IMBARAGA and YAED did not meet one or more mandatory requirements and were thus not evaluated further.
5. The bids were evaluated independently by the members of the evaluation team. The winning proposal based on the total highest scores awarded by all evaluators was from SunDanzer in collaboration with Winrock International.
6. The key principles of inclusiveness, impartiality, transparency and rigour have been met throughout the process, as summarized below:
 - **Inclusiveness:** The selection was based on an open call posted at the IFAD website and was as such open for all interested bidders.
 - **Impartiality:** The bidders were given one month from the posting of the call to the deadline for submission. All the proposals and documented capacities of the bidders were rated with the same criteria stated in the evaluation sheet that was prepared at the time of launching the call and was used by all evaluators. Each criteria was discussed and the final scores agreed during the evaluation meeting.
 - **Transparency:** All bidders had access to the same call for proposals document posted on a dedicated page of the IFAD website . During the question and answer period the questions were answered within four working days after receipt and all questions asked were posted on the website for easy access. A wrap-up of the questions and answers was published on the website of the call after the deadline. The evaluation criteria were included for everyone to see in the call for proposals document.

- **Rigor:** Nine proposals were submitted and were evaluated. The evaluators covered all technical aspects, the IFAD country management perspective and linkages to the IFAD loan projects. ESA representatives were invited to participate, but later indicated unavailability. In addition the evaluation benefitted from guidance from Finance, Procurement and Legal IFAD experts as observers. These meeting minutes present all data related to the evaluation process. All communication and documents submitted from bidders are filed in PTA grant archives.
7. SunDanzer in partnership with Winrock has been selected as the grant recipient for the project through a competitive process using an open call for proposals evaluated by a selection panel. The SunDanzer/Winrock team has unique qualifications and experience to successfully develop new green cold chain technologies tailored to smallholders in Africa. SunDanzer has developed and commercialized innovative battery-free solar refrigeration technologies for residential and vaccine preservation markets worldwide, and received the NASA Commercial Invention of the Year Award for 2011 for this technology.
 8. SunDanzer has a strong partnership with their implementing partner Winrock, who currently has 15 projects in Sub-Saharan Africa, with offices in Kenya, Malawi, Mozambique and Tanzania, thus they show strong capacity to work in all countries proposed under this project
 9. In terms of scaling up, the project implemented by SunDanzer provides significant opportunities for scaling up with the private sector and IFAD supported projects, as they already have strong experience in developing low maintenance solar technologies.
 10. As a private company, partnership with Winrock will balance commercial and social interests, to respond to customer needs.

Brief overview of private sector recipient and partner

11. The grant will be implemented through a partnership between SunDanzer (as recipient) and Winrock international SunDanzer served as the prime contractor for the USAID-funded PV-SMART project in Kenya and managed a sub-grant to Winrock for that project
12. **SunDanzer** is a private technology company registered in the USA and founded in 1999 by the leader of NASA's Advanced Technology Refrigeration Project with the goal of utilizing state-of-the-art technology for solving age-old earth-bound problems. SunDanzer developed the first battery-free solar powered refrigerator, designed for small off-grid consumers, and has delivered thousands of solar powered refrigerators and freezers around the world for more than 15 years. SunDanzer's solar refrigerators and freezers are used to cool and preserve a range of products –milk, fish, meat, vegetables, vaccines – for households, farms, and small enterprises in remote locations. By forming strategic alliances with world-class refrigerator manufacturers, SunDanzer has brought cutting edge technology into remote homes at very low cost.
13. SunDanzer's commitment to quality and service has grown and maintained a loyal customer and dealer base. SunDanzer has a distribution network in East Africa in partnership with representative Chloride- Exide, which also has offices in Uganda and Tanzania. Chloride-Exide also established Solinc East Africa in 2012, which is the only fabricator of PV modules in East Africa. Annually, approximately 600 professionals are deployed in the field on Transacted assignments worldwide. The company has successfully conducted over 5,000 short and long-term projects and programmes across 150 countries worldwide.
14. The comparative advantages of SunDanzer's solar chilling technology include:
 - **No Batteries.** SunDanzer's "direct-drive" solar chilling technology uses a direct current compressor to chill ice stored in the walls of the refrigeration unit. Unlike batteries, ice has no maintenance or replacement costs.
 - **Reliable.** SunDanzer units couple mature photovoltaic technologies with mature high

efficiency vapor-compression technologies. New Mexico State University tested an early SunDanzer direct drive prototype from 1999 to 2009 with no failures experienced over a decade. Pilot solar milk chilling units in Kenya have operated for 2.5 years with no failures.

- **Affordable.** SunDanzer solar direct-drive vaccine units are the most affordable on the market today.
- **Dealer network in Africa.** SunDanzer's distributor Chloride Exide has offices in Kenya, Uganda, and Tanzania, and also serves Rwanda. SunDanzer also has a partnership with African Energy, which serves Mozambique, Zimbabwe, and Malawi.

15. **Winrock International** is a non-governmental organization working around the world to empower the disadvantaged, increase economic opportunity, and sustain natural resources, matching innovative approaches in agriculture, clean energy and water, environment, civil society, governance, and education with the unique needs of its partners. Winrock currently has 132 active projects or activities in 35 countries including 15 in Sub-Saharan Africa, and 10 global activities. Winrock operates from primary offices in the United States, and support offices in Nairobi, Kenya and Manila, Philippines, as well as project offices in Malawi, Mozambique, and Tanzania. Winrock has managed and implemented a pipeline of over \$1.5 billion in contracts, cooperative agreements and grants for USAID and other donors since 1985.

16. Winrock has worked in sub-Saharan Africa for more than 30 years, and has implemented multiple projects in all five of Green Tech's target countries. Winrock has active projects, on-the-ground staff, and project offices in all the target countries of the grant project except Zimbabwe.

17. Winrock's agriculture programs partner with communities to develop and implement strategies that improve agricultural production systems, strengthen natural resource management and reduce environmental degradation. Winrock has established cold chains for horticulture, dairy, and aquaculture value chains in Bangladesh, Pakistan, Indonesia, and the Philippines. Winrock's energy work focuses on expanding access to and scale-up of clean energy for rural electrification and productive uses, using sustainable, market-driven approaches that promote food and energy security and reduce air pollution and greenhouse gas emissions. Winrock is experienced with project design, implementation, and management; conducting technology and market assessments; developing project pipelines and mobilizing investments; advising on energy planning and policy reform; and training and building local capacity in renewable energy applications. Winrock's renewable energy solutions include on-grid, mini-grid, and off-grid systems, using a range of technologies including solar, wind, biomass, geothermal, hydropower, and improved cookstoves.